WORLD OIL

Established 1916 as THE OIL WEEKLY

Specialized Oil Publications of
THE GULF PUBLISHING COMPANY
Box 2608, Houston (1), Texas

WORLD OIL and The COMPOSITE CATALOG
for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

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Published every Monday. Single copies 25 cents (except special issues). Subscription price: domestic and foreign, $2 a year; 2 years, $3; 3 years, $4. Advertising rates on application.

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Contents

JULY 14, 1947

VOLUME 126, No. 7

Technical and Feature Articles

OIL PRICES NOT EXCESSIVE 32
By L. J. Logan

AJAX PIPE LINE CORPORATION'S SYSTEM (23rd of a series) 33

CONTOURING FAULT PLANES 34
By W. A. Reiter

SELECTION OF MUD FLUID FOR COMPLETION OF WELLS 36
By H. E. Radford

OIL—ITS ORIGIN AND ACCUMULATION *(First of Two Parts)* 39
By Dr. F. M. Van Tuyl and Dr. Ben H. Parker

EFFECT OF THERMAL CHANGES ON NATURAL BRINE DENSITIES 45
By Dr. Homer A. Hoskins

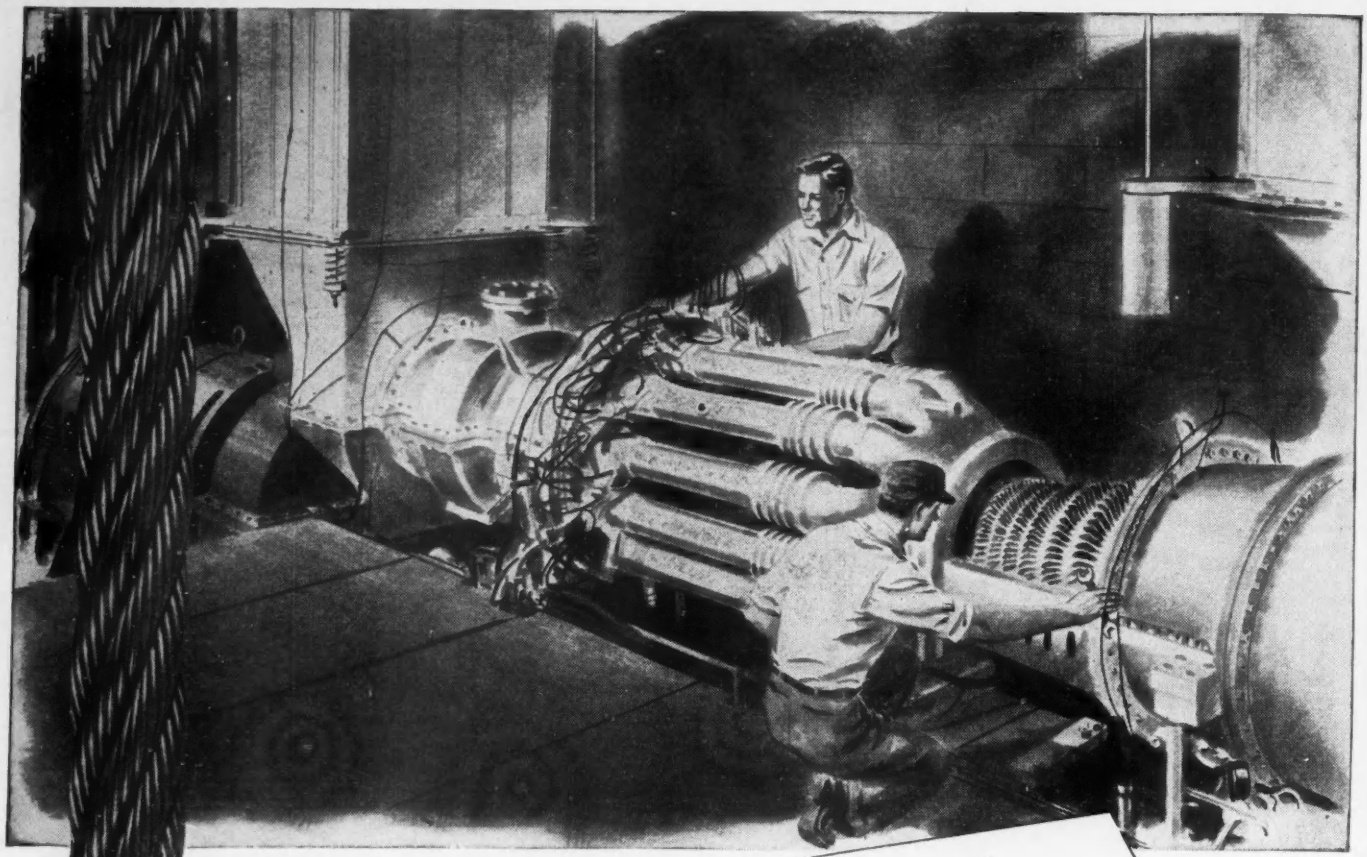
RECOMMENDATIONS ON U. S. NATIONAL OIL POLICY 48
(First of Four Parts)

BUSINESS ACTIVITY AND FOREIGN AFFAIRS AT CRITICAL POINT 54

DRILLING HINTS 62

News and Departments

LOOKING AHEAD	2	PATENT ROUNDUP	66
THE OUTLOOK	19	MARKET TRENDS	67
THE CHANGING PANORAMA	21	FIELD OPERATIONS	69
THE WEEK'S NEWS	23	THE OIL MAN'S CALENDAR	70
CRUDE PRODUCTION	25	EXPLORATORY FAILURES	82
INTERNATIONAL NEWS	27	MEN IN THE INDUSTRY NEWS	83
PIPE LINE NEWS	28	MANUFACTURERS' NOTES	85
THE LETTERS OF PAUL PEEBLES	31	SQUEAKS FROM THE BULL WHEEL	87
NEW EQUIPMENT, LITERATURE	57	ADVERTISERS' INDEX	88



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Atomic Power Likely To Be Future Factor

BECAUSE atomic energy represents potential competition for oil and gas as fuels, the work that is now being done toward industrial use of nuclear energy is of some direct significance to the oil and gas industries. The first installation for converting atomic power into usable electric power, now under construction at Oak Ridge, Tenn., is expected to be completed by mid-1948. The development already offers some rough ideas as to the relative cost of power obtained in this way, as compared with power derived from coal, oil, or gas.

Tentative calculations make nuclear fuel appear to have practical possibilities for competing with coal, oil, gas, or water power for generating electricity at large stationary plants. It is figured that atomic power in its early application will cost about the same as power derived from coal costing $10 a ton. On this basis, atomic power would be competitive with power from other sources in some parts of the world.

The cost of coal to American utility companies now averages about $6 a ton, but in some areas it is $10 a ton or more. Fuel oil is competitive with coal but in general has no price advantage over coal for generating electric power. Natural gas where used in the Southwest is relatively cheap, being equivalent to coal at $2.50 a ton, but transportation to the East puts the cost around or above the cost of coal or oil.

The pioneering installation at Oak Ridge is a pilot plant, designed to produce electricity on small but commercial scale. The project is a cooperative development of a dozen or more large industrial and utility companies. From uranium or plutonium an atom-splitting furnace will release controlled energy in the form of heat. The heat will be picked up and conducted out of the furnace by liquid or gas, flowing through pipes. The hot liquid or gas will then flow over tubes in which water will be converted into steam. The steam then will be used in the conventional way to operate a turbine that will drive an electric generator.

Because of the great size and weight of the furnace in controlling the dangerous reactions, the use of atomic power plants as now designed would be limited to electric power or large industrial plants or to very large mobile units as on battleships. Therefore, atomic power so far means potential competition for the oil industry only as regards heavy fuel oils, which are virtually by-products.

Oil and Gas Firms To Spend Billions

WHILE the petroleum industry plans to make capital expenditures of $4 billion in 1947 and 1948, another $1 billion will be invested, as materials are made available, by the gas-utility industry. The former estimate is that of the American Petroleum Institute and the latter by the American Gas Association.

The gas utility expenditures will be for expanding production, transmissions, and distribution capacity to meet the continually rising demand, just as the petroleum industry expansion is needed for the same purpose.

The gas industry expansion is handicapped by shortages of materials, principally steel, pipe, and tin plate. The petroleum industry is hampered by shortages of casing, tubing, and other materials for oil well drilling, and by the scarcity of line pipe for needed pipe line construction.

Both industries also are handicapped by the inadequacy of the nation's transportation facilities, as exemplified in shortages of railroad freight cars of various kinds, tank cars, etc.

Following the war years in which repairs, maintenance, and expansion were necessarily deferred, there are still many scarcities and shortages, but as these are relieved, the petroleum and gas industries will go forward with large scale expansion.

Railroads to Use More Diesel Oil

A HIGHLY significant trend is evident in connection with the use of diesel oil, foreshadowing steady increase in demand for that product. It is the trend toward diesel-electric locomotives on the railroads. Although 37,000 of the nation's 41,000 locomotives are coal-burning, the railroads now show strong preference for diesel-electrics, of which they now operate about 3700. There are now nearly 650 outstanding orders for locomotives, involving cost of over $300 million, and over 90 percent are for diesels.

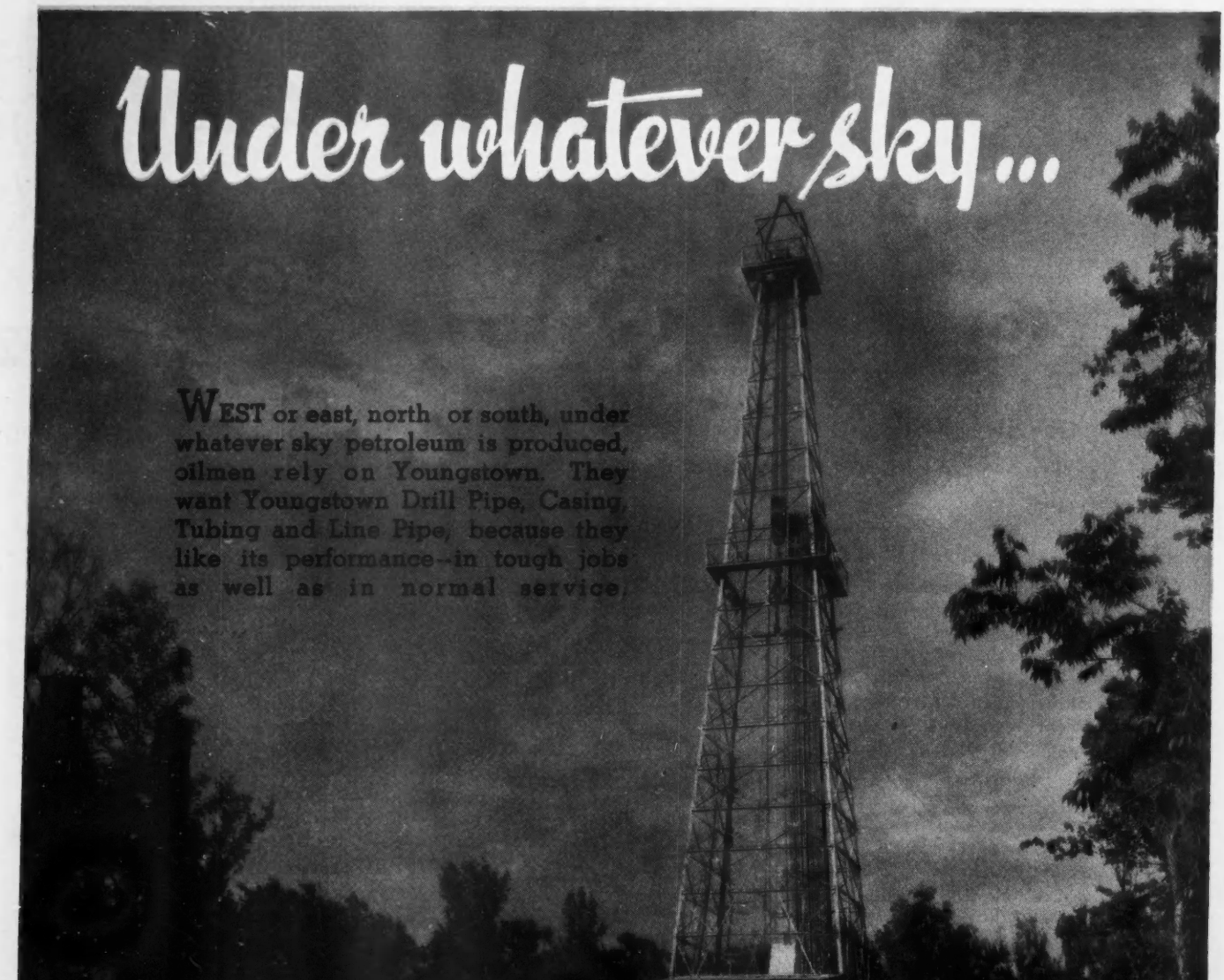
To replace all the coal-burning locomotives with diesel-electrics would require billions of dollars and a long period of time, but this is a definite long-term prospect. Several railroads have plans for early complete dieselization, while a few already are or very soon will be all-diesel.

While the cost of a diesel-electric is double that of a comparable steam locomotive, the higher initial cost is more than offset by savings in operation. Fuel costs are reduced around 50 percent or more by the diesels, which also afford economies in maintenance, repairs, and immediate availability for service without steaming up. Smoother operation affords comfort for passengers and reduction of damage to freight.

While diesel oil is used extensively for ships and other purposes, the prospective large use by railroads makes it advisable for oil companies to make plans for supplying the increased demand.

*

Having never held a position with any of the executive departments of the government, I have not had an opportunity to become a great man, imbued with unusual wisdom and sagacity. I have never become sufficiently informed that I wanted to change the Constitution and the Bill of Rights of this, the greatest of all nations.
—H. J. PORTER, President, Texas Independent Producers and Royalty Owners Association.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THE WEEK'S NEWS

THE Anglo-American petroleum agreement now is so buttressed by reservations and amendments as to make it "perfectly clear" it will confer no executive power on the international commission or change the existing division of authority between the federal government and the states, the Senate Foreign Relations Committee reported to the Senate in recommending ratification. Page 26.

Military Requirements Will Be Met—OGD Director Max W. Ball's intimation that failure of the industry to meet military oil requirements might lead to federal control brought from company executives on NPC assurances that those needs would be met. Page 25.

Midwest Oil Shortages Will Be Localized—Industry spokesmen express confidence before the House Interstate Commerce Committee that Midwest oil shortages will be kept localized and brief. Story below.

Supply Increasing Faster Than Demand—IPAA supply and demand committee reports current situation favorable, with supply increasing faster than demand. Page 24.

TET Seeks Permanent Operation of Big Inch Lines—Hearings on the application of Texas Eastern Transmission Company for permanent operation of the Big Inch pipe lines opened before FPC with coal and rail interests accepting the current gas shortage in the Appalachian area as necessitating additional supplies but fighting extension of service to the seaboard. Page 28.

Michigan-Wisconsin Gas Line Order Attacked—Panhandle Eastern Pipe Line Company has filed a new petition in the courts to overthrow the FPC order authorizing the Michigan-Wisconsin Pipe Line Company to build a gas line to compete in Detroit. Page 28.

Refining Capacity Adequate to Meet Needs—Existing refinery capacity is adequate to meet current requirements, but the margin of safety is undesirably low, according to a survey by the NPC refining capacity committee. Page 25.

Congress to Dispose of Oil Legislation—Congress plans quick disposal of pending oil and gas legislation to permit adjournment July 26. Page 26.

House Group Broadens Domestic Oil Investigation to Cover World Trend

Broadening its investigation of the domestic oil shortage to cover the world situation, the House Interstate and Foreign Commerce Committee last week developed the views of the government departments and the industries to supplement the testimony given by Max W. Ball, director of the Oil and Gas Division, at its July 1 hearing.

During the course of its inquiry the committee developed a number of high spots:

1) The War and Navy Departments are developing plans both to meet the current U. S. situation and for any future emergency which may arise, and may call upon Congress for legislation to implement the latter.

2) The State Department believes the present domestic situation to be only temporary and apparently sees nothing to require a change in its policy of encouraging imports to supplement but not supplant domestic production.

3) The Commerce Department considers the desirability of oil exports from the standpoint of what the U. S. would get in return, but did not explain what we get from Russia in return for oil, and is opposed to any drastic curtailment of oil exports possibly even to the extent of maintaining them in the face of rationing here.

4) The Office of Defense Transportation is taking steps to meet the Midwest emergency, but will reimpose the wartime restrictions on tank cars only as a last resort.

5) The oil industry itself is confident that the nation's petroleum needs will be met next winter, barring only exceptionally cold weather or unforeseen adverse developments in industrial output or transportation.

Although the military used approximately 32 percent of the total U. S. crude produced during the peak of the war, it now is down to a level of four percent but cannot even fill those requirements, it was complained by Colonel G. H. Vogel of the Army-Navy Petroleum Board.

Vogel said that for the last half of this year the military are short of meeting their requirements by 1 million barrels of motor gasoline, 1,600,000 barrels of aviation gasoline and 500,000 barrels monthly of Navy special fuel oil. Current requirements, he reported, call for 0.9 percent of the motor gasoline available in the country, 50 percent of the aviation gasoline, 100 percent of the jet fuel, 0.7 percent of kerosine, nine percent of the diesel oil, and five percent of the Navy special.

Most of the difficulty is in respect to these types of military requirements, he said, explaining that supplies for posts and stations within the country are secured through the Federal Bureau of Supply, which has reported that it expects to get approximately the same quantities as it did last year.

Vogel outlined the steps which had been taken, in cooperation with the OGD and the NPC, to meet the situation. He said the Army has a fleet of 3600 tank cars which are being used to move its oil and thus lighten the strain on commercial transportation, and added that consideration is being given to the possibility of diverting some of the cars to handle civilian supplies although the indications are the load will be too great to permit it.

Captain Ralph E. Wilson, also of the ANPB, said the Navy has 36 oilers which are in constant service supplying the fleet and hauling oil from the Persian Gulf to the western Pacific and, now, to Norfolk, Va.

Under questioning by Representative Carl Hinshaw of California, Vogel said the domestic situation and the Persian Gulf supplies are factors which are considered in military planning. Plans are in the making, he said, for the meeting of any emergency, but it is not yet known whether they will require any Congressional action.

Observing his reluctance to testify regarding military planning, the committee arranged to have Vogel and Wilson appear at executive sessions to go into that subject.

However, Vogel said, whether Western Hemisphere supplies will be adequate in the event of an emergency will depend upon their ability to produce and their availability. He said the military recommended "very definitely" the first priority was that the oil industry of the United States and the western hemishere "must be kept current and healthy to produce our major military requirements if possible." Domestic supplies should be supplemented by imports to avoid too rapid depletion of American stocks but only "within the limits of maintaining a healthy industry in the United States," he told Hinshaw.

Charles B. Rayner, petroleum adviser to the State Department, explained the department's position on imports, stressing the importance of maintaining a healthy industry.

The Office of Defense Transportation has been on top of the emergency right along and within the past month has arranged for an emergency movement of 99,300 barrels daily of oil into the Middle West, Director J. Monroe Johnston told the committee.

If the situation becomes really precarious, Johnston said, the ODT could reimpose the wartime restrictions on the use of tank cars for trips of less than 150 to 200 miles, the latter restriction adding 15,000 cars to the fleet, but it is not now believed such a step will be necessary.

The railroads during the first 24 weeks of this year moved an average of 52,598 tank cars of oil weekly as against 45,596 cars in the same period last year, Johnston reported. The carriers will be able to meet a petroleum emergency better than a transportation emergency, he said, because there are fewer box cars and less rail available than a year ago whereas the number of new tank cars delivered shortly will rise to 450 a month.

Emphasizing that the United States

for years has been a major exporter of oil, shipments for the past 15 years accounting for approximately 18 percent of foreign oil consumption, and also a substantial importer, providing about ten percent of the total available supply in that way, Undersecretary of Commerce William C. Foster argued that these movements "are an integral part of an extremely complicated and delicately balanced world structure of oil production, refining, transportation and marketing."

Referring to a picture showing a Russian vessel on the West Coast preparing to load oil in steel drums and recalling that before the war Japan purchased much oil here in drums and the "steel later was returned to us in different form," Hinshaw asked Foster whether it would not be desirable to prohibit the export of oil in drums, and the latter agreed to look into the matter.

Department of Commerce figures show that 12 percent of the domestic production of casing and pipe is being exported this year as against eight percent in 1946, it was testified by Dr. Francis McIntyre, head of the export control division. Shipments last year amounted to 445,000 tons.

Foster told the committee, in response to questions as to what would be done regarding exports if the situation in this country necessitated rationing, that at present he does not know whether he would ration foreign purchasers before domestic users, explaining that the problem is approached from the point of what this country would receive in return for exports. He said that in passing on exports of products, for instance, weight is given the fact that such shipments might be more than offset by imports of needed crude. Representatives of the Army and Navy, he added, participate in the making of decisions.

Industry's Views Given

Presenting the industry's views, Eugene Holman, president of Standard Oil Company (New Jersey); Walter S. Hallanan, president of Plymouth Oil Company and chairman of NPC, and B. A. Hardey, president of the Independent Petroleum Association of America, assured the committee of their confidence that shortages this year will be confined to the Middle West and will be purely local and temporary in nature.

Their testimony demonstrated the industry is conscious of its responsibility and is taking steps to deal with the situation. An additional 80,000 to 90,000 barrels daily of pipe line capacity will be completed this year and another 250,000 barrels in 1948; production last month reached an alltime record of 5,108,000 barrels daily and refinery crude runs set a new high at 5,121,000 barrels daily; imports are at a high level and exports are being held down. Most of the headaches will be felt by the industry rather than the public, it was agreed.

Both Hallanan and Hardey emphasized the efforts which the independents are making to expand production. Approximately 75 percent of the 11,750 wells completed in the first four months of this year were drilled by independent operators, but both development and transportation are being retarded by the loss of materials which are being diverted to foreign countries under State Department policies which they criticized.

With Holman, the committee explored the world situation and was told that settlement of differences between the Dutch and Indonesians in Sumatra would permit the resumption of operations there, adding up to 150,000 barrels daily to world supplies and greatly relieving the world situation.

Explaining the flow of oil throughout the world, Holman said it is probable that eventually European needs will be filled from the Middle East and all western hemisphere oil will be consumed in its own area.

Holman told the committee that of the approximate 184,000 barrels daily of production in Europe, 75 to 80 percent is areas controlled by the Russians and "disappears behind the iron curtain."

Because of the world shortage, Holman said, it is probable that present import rates are as high as are practicable until additional foreign transportation facilities become available. Nowhere abroad is there a surplus of oil, he said, and a cut in our exports would "almost demand that imports also be cut to make minimum needs available to oil-starved Europe" where the results of any reduction in supply could well be calamitous.

But, he added, there need be no fear of a widespread shortage in this country now or in the future. More oil may be found here from now on than has been discovered in the past; imports from abroad eventually can be increased as need arises, and the manufacture of synthetic fuels is rapidly being developed.

Some members of the committee expressed apprehension over possible marked increases in prices of gasoline and heating oils to the consumer. They were assured by Holman that the oil industry is "not going to price itself out of business" and realizes the public must have liquid fuels at reasonable prices, which he is confident will prevail.

Another Investigation Into Shortages

With a long list of witnesses scheduled to be heard, a Senate Public Lands Subcommittee will open three days of hearings July 14 to probe into the shortages of steel and oil.

As did the House Interstate Commerce Committee, the Senate group will hear representatives of the Oil and Gas Division, State Department and the military, and has called a number of industry executives, including James Terry Duce of Arabian American Oil Company, Eugene Holman of Standard Oil Company (New Jersey), B. A. Hardey of the Independent Petroleum Association of America, and B. Brewster Jennings of Socony-Vacuum Oil Company.

IPAA Committee Reports Supply and Demand Rise

Substantiating contentions that there is no over-all shortage of oil, the supply and demand committee of the Independent Petroleum Association of America reported to the Interstate Oil Compact Commission last week that available figures for the second quarter indicate total demand is running about two percent above the forecasts of three months ago while total supply is approximately three percent higher.

Estimated total supply for the quarter was 5,860,000 barrels daily against 5,459,000 in the same period of 1946, compared with April estimates of 5,660,000 barrels daily by the Bureau of Mines, 5,730,000 by the Compact economic committee and 5,650,000 by the IPAA committee. Total demand was placed at 5,690,000 barrels daily against 5,285,000 in the same period last year, compared with estimates of 5,560,000 by the bureau, 5,575,000 by the compact committee and 5,560,000 by the IPAA group.

"Local supply difficulties, resulting from over four years of restrictions on the construction of new facilities and from persistent shortages of steel, continue to exist in various areas as shown by the temporary plans for allocating gasoline supplies to dealers in the Midwest," the committee commented. "Another example of these maladjustments is found in the increase of 13 million barrels in total stocks of crude petroleum during the past year with nine million of the increase in the area east of California which could have been added to the supply of refined products if transportation to refineries needing this crude were available. Stocks of principal refined products at the end of June were three million barrels (two percent) lower than last year in the area east of California and approximately eight million barrels above the 1946 level in California."

House Considers Rizley Bill to Amend Gas Act

The House late on July 11 took up the Rizley bill to amend the Natural Gas Act with a view to passing it and sending it along to the Senate before the weekend adjournment.

The measure came up under a rule limiting debate but not barring the offering of amendments from the floor, and the major effort of the opposition was expected to be an amendment striking out all provisions except one exempting independent producers and gatherers from FPC control.

Stripper Well Meeting

A meeting of the joint stripper well committee composed of members of committees of the Interstate Oil Compact Commission, Independent Petroleum Association of America and the National Stripper Well Association, has been called by Don T. Andrus, committee chairman. Purpose of the meeting, to be held July 19 at the Jefferson Hotel, St. Louis, is to considere plans and suggestions for gathering stripper data.

NPC Told Failure to Meet Military Needs Might Lead to Federal Control

An intimation by OGD Director Max W. Ball that failure of the industry to meet military oil requirements might lead to efforts to secure legislation giving the government requisitioning powers and a first step toward federal control brought from company executives on the National Petroleum Council assurances that those needs would be met.

The discussion of military requirements, the steel situation and other phases of the petroleum shortage occupied practically all the time of the council's quarterly meeting July 10. All of the committee reports were adopted except that of the materials committee (*The Oil Weekly*, June 16) which, after discussion, was laid over until the next meeting, but no resolutions were offered and no definite action was taken on any of the problems reviewed.

The materials report was laid over after State and Commerce Department officials reported that exports of pipe are now being rigorously controlled. A further factor was recent statements of steel executives that the pipe situation would probably be markedly easier by next summer and might be improved even before the end of next winter.

Army and Navy representatives reported that specifications and procedures are being materially modified and that an escalator clause will be put on prices, so as to make it easier for the industry to bid on military needs. A supplementary report of the committee on military and government requirements showed that at present one-sixth of the requirements for the first quarter of the current fiscal year, one-third of those for the second quarter, and two-thirds of those for the last half still are uncovered. Particularly needed are approximately 1,500,000 barrels additional of aviation gasoline, 75,000 barrels of jet fuel, 1 million barrels of motor gasoline and 60,000 barrels of 80-octane gasoline. The Navy needs 20,000 barrels daily of fuel oil to meet current requirements on the West Coast. The industry is asked only to furnish oil for immediate requirements on the East Coast, and some 3,400,000 barrels to be brought in from the Persian Gulf will be used to replenish East Coast storage.

A round-up report submitted by B. B. Jennings, chairman of the committee on petroleum transportation facilities, largely summarizing the findings of subcommittees to each of which had been assigned a specific type of transportation, showed that pipe lines are needed to move West Texas oil and to increase deliveries into the Mid-Continent area and the Illinois, Indiana and Ohio refining centers and stressed the need for more tank cars.

The council accepted with appropriate expressions of regret the resignation of R. G. A. Van Der Woude, who is retiring as president of Shell Oil Company, and presented a plaque to Ralph K. Davies on which was inscribed the resolution adopted at its January meeting expressing appreciation of his service as first director of the OGD.

Pan American Buys Shield Property for $5 Million

Pan American Production Company has purchased all of the producing interests of Fred W. Shield of San Antonio in 12 Southwest Texas oil fields and in the Goldsmith pool in Ector County, West Texas, E. R. Turner, vice president, has announced.

The properties involved consist of 28 leases on which are located 78 oil wells and 12 gas wells. The major portion of the purchased production is in the Tom O'Connor, Refugio, Shield and Tulsita-Wilcox fields.

Interests in some of these properties, owned by Joseph S. and W. C. Morris, also of San Antonio, were included in the deal.

The consideration was reported to be slightly in excess of $5 million.

Crude Oil Production in the United States

(Estimates compiled by WORLD OIL. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED July 12	July 5
Alabama	1,100	1,150
Arkansas	75,750	76,000
California	917,600	919,800
Colorado	45,000	39,750
Florida	975	1,200
Illinois	178,000	183,100
Indiana	18,000	18,000
Kansas	285,800	290,600
Kentucky	26,750	26,750
Louisiana	421,550	420,000
North Louisiana	97,000	96,800
South Louisiana	324,550	323,200
Michigan	42,000	44,000
Mississippi	98,600	96,800
Missouri	100	100
Montana	24,750	25,000
Nebraska	550	600
New Mexico	108,650	107,700
New York	12,900	13,200
Ohio	9,000	8,600
Oklahoma	387,900	388,250
Pennsylvania	34,100	34,600
Tennessee	25	25
Texas	2,224,050	2,251,875
Tex. R. R. Comm. Districts:		
Dist. 1—South Central	22,400	22,075
Dist. 2—Middle Gulf Coast	163,350	164,725
Dist. 3—Upper Gulf Coast	479,650	486,025
Dist. 4—Lower Gulf-S.W.	241,650	244,250
Dist. 5—East Central	39,150	39,500
Dist. 6—East Texas Field	324,000	328,275
Dist. 6—Rest of Northeast	113,400	114,550
Dist. 7-B—North Central	37,100	38,125
Dist. 7-C—West Central	38,850	38,900
Dist. 8—West	555,250	557,600
Dist. 9—North	125,500	132,350
Dist. 10—Panhandle	83,750	85,500
Virginia	200	200
West Virginia	7,000	7,500
Wyoming	118,000	121,000
Total United States	5,038,350	5,075,800

Total stocks, foreign and domestic, July 5, as reported by the Bureau of Mines were 233,810,000 barrels.

Capacity of Refineries Adequate to Meet Demand

Existing refinery capacity is adequate to meet the needs of the country, but there is little margin of safety, it was reported last week by the National Petroleum Council's committee on refining capacity headed by Dr. Robert E. Wilson, chairman of the board, Standard Oil Company (Indiana).

Total capacity of refineries now built, the committee found, is 5,648,000 barrels daily, and operations recently have been at 91 percent of capacity. Thus, while refining capacity is not at present a bottleneck in the supplying of petroleum products, it was pointed out, that nine percent of operation to capacity is not a substantial margin, since much of the idle capacity is poorly located for transportation purposes or unable to handle the high-sulfur crudes which constitute the main additional supply now available. This small margin, too, it was commented, tends to aggravate the shortage of transportation and accentuate the effect of any major refinery strikes that might occur such as, for instance, the present loss of 79,000 barrels daily due to strikes which so far have cost the country 13,100,000 barrels of products this year, plus another 1,900,000 barrels as the result of the Texas City disaster.

The committee found that during the next 12 months an additional 212,800 barrels of refinery capacity will be added which "seems rather small in view of the large sums which are currently being expended in refinery construction."

However, the committee added, "much of this refinery construction is of a character which improves gasoline yield and quality or permits the handling of a wider variety of crudes without substantially increasing crude running capacity. It is also probable that figures for expansion of capacity do not include many minor projects involving bottleneck elimination which will in the aggregate result in a substantial increase in capacity."

The committee report emphasized that refinery capacity expansion has further been held back by materials shortages and by the general governmental policy both during and since the war of refusing or discouraging building projects whose primary purpose was that of expanding refining capacity.

Export Controls on Crude Products and Pipe Extended

Extension of export controls on petroleum products and pipe and casing until next February 29 has been agreed upon by House and Senate conferees.

Under the legislation, priorities may be established for the production and delivery for export of commodities under control upon certification by the Secretary of State that their prompt export is of high public importance and essential to the foreign policy of the United States. The administration of controls will continue as the responsibility of the Department of Commerce.

Senate Committee Urges Favorable Action on Anglo-American Oil Pact

Declaring the reservations and amendments to the Anglo-American petroleum agreement make it "perfectly clear that the agreement does not confer any executive power on the International Petroleum Commission" and does not change the existing constitutional division of authority between the states and the federal government, the Senate Foreign Relations Committee last week recommended favorable action be taken on the pact.

The formal report of the committee, submitted by Chairman Arthur Vandenberg of Michigan, discussed in detail the objections raised by opponents of the treaty at recent hearings.

The committee agreed with the proponents that, instead of leading to the creation of a world petroleum cartel, the provisions of the agreement "are incompatible with monopoly, cartels or other restraints on trade."

However, the report showed, the committee agreed with the industry that the provisions of the agreement should be clarified so as to avert any possibility of future misconstruction, and to that end accepted the three reservations of the American Petroleum Institute and the two amendments to the agreement itself proposed by Vandenberg.

"It is the committee's understanding that the agreement will not be binding upon the United States until these reservations have been fully accepted by Great Britain," the Senate was told.

Accomplishments of Pact

The report listed the accomplishments of the agreement, and, pointing out that the United States is suffering from spot shortages in Middle West states and we are becoming a net importer of oil, expressed the belief that our oil reserves are sufficient and the domestic industry is able to meet normal demands from domestic production operating normally.

The accomplishments of the agreement were listed by the committee as follows:

"1) It provides a cooperative approach to common problems through the establishment of a forum where technical and economic relations in international oil can be discussed by expert representatives. This is particularly important in view of the increased military and economic significance of oil.

"2) It provides for full and adequate government - industry collaboration and consultation in the activities of the commission which will operate under the agreement.

"3) It condemns practices and arrangements which restrict an expanding international trade in petroleum.

"4) It embodies a formal recognition by both governments of the principle of equal commercial opportunity.

"5) It recognizes that in making supplies of petroleum accessible in international trade, the interests of the producing countries should be safeguarded with a view to their economic advancement.

"6) It provides a method of attempting to resolve at their inception the difficulties that may arise in our international petroleum relations, thus preventing them from developing into issues of major proportions which might lead to drastic unilateral action, as has been the case in the past.

"7) The consultation and collaboration provided for in the agreement both from the domestic as well as the international aspect should serve to bring about good will and understanding in the field of a vital commodity and should make a significant contribution toward the realization of world peace."

Hallanan and Brown Will Speak at Compact Meeting

Walter S. Hallanan, chairman of the National Petroleum Council, will speak at the summer quarterly meeting of the Interstate Oil Compact Commission in Great Falls, Mont., August 11-13, Chairman Hiram M. Dow has announced.

Russell B. Brown, general counsel, Independent Petroleum Association of America, also has accepted invitation to appear on the program. He will discuss national oil affairs and particularly the current situation with respect to imports.

Discussion of the experiments in making oil from shale and coal in Colorado will occupy prominent place on the program. Warwick M. Downing, Denver, Colo., will present a paper on the recommendatory powers of the Compact Commission.

Several compact committees are working on studies for presentation at the Great Falls meeting. The regulatory practices committee met in Oklahoma City on July 1 to consider aspects of maximum efficient rates of production and is preparing a report on factors and standards that may be used by the states in establishing maximum efficient production rates. Well spacing practices in all states are being analyzed by the research and coordinating committee.

Legal aspects of secondary recovery are being reviewed by the legal committee. A sub-committee composed of Robert E. Hardwicke, Fort Worth, chairman; T. Murray Robinson, Oklahoma City, and E. Leland Richardson, Baton Rouge, is revising the 1942 report on secondary recovery and related operations.

Pipe Export Changes Made

The Office of International Trade has removed welded oil-line pipe from the consolidated license procedure and, effective July 9, placed all shipments under individual license. At the same time, effective July 15, it placed seamless casing and oil-line pipe on the positive list, requiring individual licenses for exports in excess of $100 to Group K countries and $25 to other destinations.

Congress Moves to Clear Slate of Oil Legislation

Throwing its machinery into high gear in an effort to clear its slate for adjournment July 26, as scheduled, Congress last week moved quickly to work off the oil and gas legislation listed for enactment this year.

Plowing through its calendar, the House, without debate, passed the Senate measure providing a four-year extension of the Interstate Oil Compact, sending the legislation to the White House for President Truman's signature, and also passed the Schwabe bill amending the Natural Gas Act to provide that holders of certificates for construction of interstate pipe lines may resort to condemnation proceedings when they are unable to reach agreement with property owners for right-of-ways, and another measure to enable the Osage Tribal Council to determine the bonus value of tracts offered for lease for oil or gas development.

A measure extending the life of the Bureau of Mines' synthetic fuel program from five to eight years and the authorized expenditure from $30 million to $60 million failed to secure the unanimous consent necessary for its consideration and was laid over, probably not to be finally acted upon until next year.

Anticipating that the last week of the session will be hectic, the House Ways and Means Committee called off the hearings on tax advantages of cooperatives and other tax-exempt organizations scheduled to begin July 21. The committee will close its present series of hearings July 18 and will return to Washington early in November to resume them.

Plea to Cut Off Exports Of Oil to Russia Ignored

A series of hearings on export of oil to Russia by the House Merchant Marine Committee led Chairman Alvin F. Weichel of Ohio to the only conclusion possible—"there's nothing Congress can do about it."

Even while the hearings were going on, and after Weichel had requested that shipments to Russia be cut off, the Department of Commerce issued the export license necessary as the result of the reimposition of export controls June 30.

Apparently indifferent to threats of congressional intervention, Commerce Undersecretary William C. Foster appeared before the committee to tell Weichel that his request for an embargo on Russia had been "taken under consideration," and that the department plans to continue to issue export licenses for oil. Calling the department's action "arrogant," Weichel told reporters "it's obvious the Commerce Department can't be trusted to take care of this country's own defense and domestic requirements for oil."

Despite the failure to accomplish anything, Weichel said, the hearings will be continued with a view to piling up a record that the department cannot ignore.

Socony-Vacuum's New Line to Relieve Oil Congestion in Eastern Venezuela

Socony-Vacuum Oil Company of Venezuela plans to place its new Eastern Venezuela pipe line in operation within the next few days. Opening of this new transportation outlet will do much to relieve current and future congestion in facilities serving the important Greater Oficina and San Joaquin areas.

The new line, although not completed in its entirety, has been finished from the Guico-Nipa area, a distance of approximately 40 miles, to the company's main camp, tank farm and pumping station at Anaco, from which point it will now connect with facilities of Mene Grande Oil Company. The latter system now has sufficient capacity to carry present production to the Caribbean terminal at Guanta.

Meanwhile, construction is continuing on the remainder of the line which will give Socony-Vacuum an independent outlet from its Guico properties to its own tanker-loading terminal, a distance of 103 miles. It is hoped that material deliveries will continue at a rate which will make completion of the entire line possible by the first of August. Many difficulties encountered in the southern portion of the line will be avoided in the part to be constructed since the route will follow right-of-ways already established for other highways and pipe lines.

Line Laid on Surface

In common with most of the major trunk lines in Eastern Venezuela, the Socony line is laid on the surface for its entire length except for spots where it crosses streams or goes through small towns. The pipe is of 12-inch diameter throughout, with a nominal capacity of 70,000 barrels daily, operating at 825 pounds pressure. Pumping problems are eased by the fact the line originates at an altitude of 930 feet, climbs to a maximum of 1015 feet within a very short distance, and then drops through the remainder of the distance to an elevation of 300 feet at the ship-loading terminal tanks. In common with loading facilities of the Compania Consolidada (Sinclair) terminal, it should be possible to perform all transfer and loading operation at the port by gravity.

Socony-Vacuum representatives have indicated a large part of the crude produced by the company in Eastern Venezuela and transported through the new facilities will be processed in the company's plants at Paulsboro, New Jersey, and other East Coast installations. The crudes are used principally for the manufacture of gasoline, fuels, wax, kerosine, lubricating oils and greases.

Necessity for New Line

The necessity for a new pipe line outlet for the Greater Oficina area has become apparent within the past year with the pronounced increases in output from West Guara and Guico, and discovery of such areas as Nipa and East Nipa just to the north. The only pipe line outlet has been through the Mene Grande Oil Company's 16-inch line which, despite additions of new pumping equipment and 16-inch loops, has become more congested. It has been looped completely from just north of the Anaco Station to Puerto la Cruz, and present plans call for possible tieing in all the way to Oficina Station to make two complete 16-inch lines, with capacity approaching 200,000 barrels daily.

Multiple-sand fields in the Oficina district, being developed by both Socony-Vacuum and Mene Grande, give promise of long flush-producing life, and there still remain perhaps a dozen separated areas around Oficina where oil has been discovered by single wildcats, but where no further development has been done since present active areas furnish enough undrilled loactions to keep equipment busy and pipe line full.

Brazil's Crude Oil Flow During May Shows Decline

Brazil's crude oil production during May totaled 7672 barrels, a slight decline from the 7731 barrels produced during April. During the first five months of 1947, the country's oil flow amounted to 41,976 barrels.

Major producing area in Brazil is the Candeias field. During May, the field's 11 oil wells flowed 6361 barrels. Two wells in the Aratu flowed 224 barrels, while the two wells in the Lobato-Joanes field produced 1087 barrels. No production was listed for the Itaparica and Pitanga fields.

New Zealand to Transfer Supply Mission Business

New Zealand has announced that effective on or after July 1, 1947, the office of the New Zealand Supply Mission will be closed and all business previously handled by the mission will be transferred to the office of the New Zealand Government Trade Commissioner in the U. S.

The trade commissioner will assume responsibility for handling, payment and shipment of all unexecuted orders previously placed by the New Zealand Supply Mission. The commissioner's United States headquarters are at the Bradford Hotel, 1800 K Street, N. W., Washington 6, D. C.

Canada Invited to Parley

A formal invitation to the province of Alberta, Canada, to send observers to the meeting of the Interstate Oil Compact Commission to be held August 11-13 in Great Falls, Montana, has been extended by the commission's executive committee. The action was taken following a recent visit to the United States by N. E. Tanner, Alberta's Minister of Land and Mines.

Venezuela's Crude Output Continues at High Rate

Venezuela's crude oil production of 1,143,457 barrels during the month of April brings the total output for the first 4 months of 1947 to 138,730,894 barrels, or 13.8 percent more than produced in the corresponding period in 1946. It is not likely that gains over 1946 will continue at this rate throughout the year, since Venezuela was reaching its high level of production during the latter months of the year, but there is every reason to suppose that 1947 crude output will be substantially greater than 1946, since world demand continues at record levels.

Preliminary figures for the first three weeks of May show the nation producing at a daily rate of 1,107,016 barrels, which was 34,441 barrels daily less than in April, but still above the levels reached at this time last year.

Drilling activity for the first four months indicates the predicted increases will be borne out. 243 wells have been completed already, pointing to an increase of more than 16 percent in completions over last year. Of these, 217 were oil wells, 4 gassers, and 22 dry holes. It is anticipated that dry holes will increase this year since wildcat activity has been accelerated.

Following are figures in barrels showing the comparative statistical positions for the January-April periods of 1946 and 1947:

	1946	1947
Total Crude Production	121,864,441	138,730,894
Production by Leading Companies:		
Creole Petroleum	66,022,633	74,350,920
Venezuelan Oil	23,793,271	28,510,866
Mene Grande	18,709,266	20,413,968
Caribbean Petroleum	5,132,388	7,121,871
Consolidada de Petroleo	3,638,608	2,630,276
Socony-Vacuum	1,961,964	3,107,273
Crude Oil Stocks	8,216,533	10,963,916
Crude Oil Refined	11,190,042	10,641,258
Crude Oil Exports	111,046,352	128,201,144
Refined Products Exports	8,914,232	7,667,510

Drill Program Announced By Shell for Australia

Shell Oil Company of Australia, Ltd., has announced a program of exploration calling for the drilling of 30 test wells over a period of the next four years at an expense of 1 million Australian pounds. Equipment has been ordered from England and the United States, including rigs rated capable of drilling to 10,000 feet. The area to be covered in the survey will comprise 50,000 square miles in Queensland and other states.

Australian Motorist Petrol Company, in association with Richfield Oil Corporation of California, has been granted an oil prospecting license for two years' duration. The authorization, given for a term of two years by the Federal authorities, covers an area of some 200,000 square miles in the western part of Australia. It had earlier been reported unofficially that Richfield was to have been associated with Papual Apinaipi Petroleum Company in a project to explore for oil in Papua. This latter still lacks confirmation.

TET Granted Authority to Install New Stations on Big Inch Carriers

Texas Eastern Transmission Corporation has been granted authority by the War Assets Administration to install six compressor stations along the Big Inch pipe lines, in addition to the four authorized by the Federal Power Commission, to step up the capacity of the system to 340,000 Mcf daily by next February. Orders for the necessary materials already have been placed and delivery commitments secured.

The four stations being built will increase the capacity of the lines from their present 140,000 Mcf daily to 265,000 Mcf and the six additional stations will further increase it by another 75,000 Mcf.

WAA explained the additional stations were authorized as a means of relieving the natural gas shortage expected in the Appalachian area next winter, and, as a further step to that end, extended the lease under which TET operates pending issuance by the FPC of a permanent certificate, to May 31, 1948.

On July 8, FPC authorized TET to add a total of 43,750 compressor horsepower to the 28,000 horsepower already authorized, to increase the capacity of the lines to 340,000 Mcf daily. The cost of the additional compressors, which will permit an increase of 65,000 Mcf daily in deliveries, will aproximate $3,200,000. Under the authorization, centrifugal compressors will be installed at six stations and reciprocating-type compressors at a seventh.

Meanwhile, hearings on the company's application for a permanent certificate opened last week before FPC, with the coal and railroad interests making a last-ditch fight against extension of natural gas service to the industrial eastern area which comprises the largest and most important coal market.

Because of the situation in the Appalachian area now served by the Big Inch system, these interests are not too strongly combatting the transportation of gas by the former oil lines, but are concentrating their opposition on extension of the lines to the Philadelphia area, with the threat of their subsequent extension to Baltimore, New York and New England.

A few days prior to the opening of hearings, TET amended its application to provide for fewer compressor stations along the system but increased horsepower and delivery capacity.

Shell's Wood River Line Is Mississippi Casualty

Shell Pipe Line Corporation's dual 10-inch lines from Cushing, Okla., to Shell Oil's Wood River, Ill., refinery, were casualties of the Mississippi flood waters as a result of a break in the east bank levee of the river, about 3 miles north of the Chain-of-Rocks bridge. The swollen river waters swept through the breach and opened up an old side channel known as Choteau Blough crossed by the pipe lines after crossing the river proper.

The breakthrough occurred on June 30 and the first line parted on July 4, the second a day later.

Shell Pipe Line's crews working under Area Superintendent L. P. Young and Chief Engineer D. H. Lewis, with the aid of dredging equipment, restored one line to service and work on the second line is in progress.

Normally, the two lines delivered 42,000 barrels daily into the refinery. Under the emergency set-up, Shell has dual lines operating to the break and from there to the refinery the one line delivers 65,000 barrels daily. The lines move West Texas crude into Wood River, and the washouts occurred only five miles short of destination.

West Texas Rail Movement Of Crude Will Be Boosted

Rail shipments of crude from Southeastern New Mexico and West Texas fields averaged 57,950 barrels daily during the week ended June 29 as compared with 60,100 barrels daily average the previous week.

This movement will be increased about mid-July when crude loadings will be started by Stanolind Pipe Line Company from its 32-car capacity rack near Wink, Texas, and on the Texas & New Mexico Railroad. Stanolind has arranged to load 5700 barrels daily of low-gravity crude which it gathers in Southeastern New Mexico and in Winkler and Ward counties, Texas, for the account of Stanolind Oil Purchasing Company. This oil will be consigned to Standard Oil Company of Indiana's Whiting, Ind., refinery.

Shell Oil soon will begin shipping 8500 barrels daily of Wasson field crude from Cosden Petroleum Corporation's refinery rack at Big Spring, Texas, for consignment to its Houston refinery. An average of 4600 barrels daily was loaded at Midland the past week for consignment to Shell Oil's Wood River, Ill., refinery.

Atlantic Removing Line

Keystone Pipe Line Company, products pipe line subsidiary of the Atlantic Refining Company, Philadelphia, has contracting crews at work in removing the 173-miles of 8-inch line between Greensboro, N. C., and Richmond, Va., that was recently purchased from the War Assets Administration for $492,940. This line was built as a war-time emergency with second-hand pipe as an extension to the Plantation Pipe Line Company's products carrier, which originates at Baton Rouge. Keystone will utilize a portion of the pipe in expanding its system, while the remainder will be shipped to Texas for use by Atlantic Pipe Line Company, an affiliated unit.

Michigan-Wisconsin Gas Line Rehearing Is Sought

Panhandle Eastern Pipe Line Company has gone to court for the second time in an effort to overturn the FPC order authorizing Michigan-Wisconsin Pipe Line Company to build a pipe line from Hansford County, Texas, to Milwaukee and the Austin storage field in Michigan (Oil Weekly, Feb. 17).

In a petition to the District of Columbia Court of Appeals, the company asked that the order be set aside and the committee required to rehear the case and receive additional evidence which Panhandle claimed it has not been permitted to submit.

Following the commission's announcement last November of a proposed order in the case, Panhandle asked for a rehearing, which was denied on the ground a final order had not been issued, and went to the Court of Appeals for relief, to be told there that it had not exhausted its remedy before the commission until a fiinal order had been issued.

The final order was issued in February, and the company again sought a rehearing, again to be denied.

In its current petition, Panhandle contends Michigan-Wisconsin will not be able to perform the service for which it secured the FPC certificate because it does not have adequate firm gas supplies; no firm commitments for financing the project; will not be able to get the necessary pipe to complete construction on time; and that the project does not have the capacity necessary to take care of all of the requirements of the Detroit market, now served by Panhandle, and, finally, the project is not economical and will result in higher gas costs to Detroit consumers.

Langer Bill Would Change Existing Gas Carrier Law

Legislation introduced in Congress by Senator William Langer of North Dakota is designed to relieve natural gas pipe lines running through the federally-owned public lands of previous requirements that they operate as common carriers.

The bill lifts gas lines out of the general provision of existing law that right-of-ways across the public domain may be granted by the Interior Department provided that petroleum and natural gas pipe lines so benefited shall operate as common carriers and accept or purchase oil or natural gas produced from government lands in the vicinity of the line in such proportionate amounts as the Secretary may determine.

Langer would provide that right-of-ways for natural gas lines granted heretofore and in the future shall require only that such lines shall purchase gas produced from Government lands in their vicinity in such proportionate amounts as the Secretary may decree. Through inadvertence, an initial report on the measure (*Oil Weekly*, June 30) stated that natural gas lines would continue to be subject to the common-carrier requirements of existing law.

Rail Commission Revises July Oil Order Upward

The Texas Railroad Commission has revised its July proration order to permit the production of 79,033 barrels more oil than was allowed originally. The new order, effective July 1, extends through August. It was entered in compliance with urgent requests from purchasers, who appeared at the statewide hearing July 9 and asked that the allowable for every field in the state be set at the MER.

Testimony was presented by every major company with lines to West Texas where most of the excess available is produced. Allowables in those districts were increased by 72,256 barrels daily.

Most of the increase granted resulted from changes in shutdown days, but allowable for 10 fields were increased to a point that would permit them to produce at the MER.

Under the old order, most fields in West Texas were permitted to produce 21 days in July and most of them were increased to 25 days.

A new allowable of 78,000 barrels was assigned to Wasson, raising that field 8947 barrels. The Foster field was raised 9237 barrels; Yates was raised 6313 barrels; and TXL Devonian 5084 barrels. About 15 other fields will be increased in the West Texas district as a result of this order.

In Gulf Coast district, the increase totaled 4845 barrels, of which 4386 will be produced at Thompson.

Military Oil Advisory Group Meets With ANPB

Members of the Military Petroleum Advisory Committee last week held their first meeting with Vice Admiral John H. Hoover, chairman, and other members of the Army-Navy Petroleum Board to discuss oil problems involved in military planning for national defense.

Selected by OGD, the committee will cooperate with the Army and Navy in much the same way as did PIWC during the war. The committee, which met with Interior Department officials two days after its session with the board, is expected to meet about every two months to review developments in military planning and take up any new problems that may arise. For the most part, in the interest of security, its proceedings will be kept confidential.

Maritime Commission Sells 30 War-Built Oil Tankers

Another 30 war-built tankers were sold by the Maritime Commission in April and May, when a total of 287 merchant vessels of all types were disposed of.

Eleven of the tankers were sold for foreign registry, ten for Panamanian registry and nine for operation under the U. S. flag. All of the vessels sold for Panamanian registry went to Overseas Tankship Corporation.

Purchasers of tankers for U. S. flag operation included the North American Shipping and Trading Company, Cities Service Oil Company, Gulf Oil Company (two), Trinidad Corporation, Charles Kurz and Co., Inc., The California Oil Company, Petrol Tanker Ind., Inc., and Hillcone S. S. Company.

THE LETTERS OF Paul Peebles, P.S.G.

Several years ago Paul Peebles, erstwhile boll-weevil on a drilling rig at Goose Creek, was a regular contributor to *The Oil Weekly*, now WORLD OIL. Paul was a hardy soul whose troubles with his fiancee, Cleopatry, daughter of his Goose Creek landlady, did not prevent his serious study of matters of importance to the oil industry. He always had an opinion, regardless. Now Paul has broken into print again, this time both on a matter of popular concern, as well as a problem of the oil business. A note accompanying his letter says that although the stenographer's typewriter is 17 years old, it just can't spell worth a damn.—The Editor.

DEAR EDITOR:

A lot of oil has gone thru the pipe lines since I last wrote to you on a scientific subject but that don't mean that I have not been studying on scientific subjects and writing my memoirs. (I started to write memories but my stenographer who is just graduated from the Double Quick Time Business College tells me "memoirs" is a 64 dollar word much in use by authors, politicians out of office and the like.)

As you know I am now living off the royalty from some wells on some land which I bought on the strength of the Great Peebles Sure Shot Oil Indicator and which was leased from me and drilled by an oil company on the strength of its geophysiSAL department. I been giving my time to science and some politics in my laboratory which I have put up in the kitchen after my fiancy, Cleo, finnally run off with that no count Red here in Goose Creek, and I did not need a kitchen.

Mr. Editor, have you ever thought of the great advancement which would be made by science if every scientist was given the royalty from five (5) wells? I have. In all my life, including the time I was offering to join up with DeGolyer and Deussen in a partnership especially operating in Conroe and the oil fields of the world, I have never eat so well as I now do from my royalty and I aim to put up a bill to Congress giving every scientist five (5) oil wells and a jeep so as to get their mind on their business instead of on where the next meal is coming from and how pretty a gal can get. (Have you ever tried to court in a jeep, just you and the gal? Mister, it can't be done.)

But getting back to science:

I been working on a new plan to get oil out of the Continental Shelf but these flying discusses have been causing so much worry I decided to give my talents to them and settle the matter right off. Tho why they call it the Continental Shelf when the Continental was beat to it by Humble & Magnolia and Texas Co., is more than I can see. Maybe Continental has an over-ride.

Now about these flying dinkusses:

Everybody from the sheriff to the undertaker, with a few jewellers in between, have been reporting to the newspapers about seeing this and that until you would of thought that prohibition had come back and the boys was drinking white mule again. Since the first report was published I been in contact with everybody who has said they has seen one and I come to the conclusion that lying is on the increase. They was even one guy who told me that one dinkus landed on the ground in front of him, and a little guy about two (2) feet tall with a head the size of a basket ball climbed down off a stool which was fixed to the dinkus and said, "Brother, can you spare a dime?" I looked into that one and found out that the guy who reported it was a former professor in a State University which lost its president by request lately and that the little guy was a leasebrooker who had confined his efforts to the Mamou field and that he had been sitting in the same spot since the Magnolia had drilled its first dry hole there.

I finally come to the conclusion that the whole thing is political. You see an election is coming up and I know a certain man who wants to run again and who wants the people to do a lot of forgetting. Now this man has a lot of influence with the airforce and he has had the airforce flying around scattering rumers and what all these people have been seeing is nothing but rumers to make them forget. I knew, of course, just as any sensible man does that you ordinarily hear rumers and do not see them, but since I and the College boys discovered how to crack up the atoms, anything is possible on account of the advancement of science. And that's all there is to it and I know you and your readers will be glad to get the straight of it.

Now that I got this settled, I want to say a few words on the oil business. I see by WORLD OIL which had a good reputation as *The Oil Weekly* way on back when I was a young man and was writing for it, that the independents is all riled up on account of the Anglo-American treaty and foreign oil. I ain't never heard before that Sinclair was an independent tho Hiram King always used to refer to Sinclair as a pore little independent. But here is what I have to advise: If the independents can't lick 'em, they ought to jine 'em. Make my old friend Russell Brown general secretary of the World Wide Alliance of American and Foreign Oil (he could still continue to do a good job with the Independents), give Harry Sinclair a slice of the Trans-Arabian, give Gene Holman the job Roy Cullen has (which I think he would trade for and become an independent) scramble all the oil stocks thru an exchange, and everybody would be happy. I would give Ickes a seat on the Continental Shelf, down on the actual shelf itself and that ought to settle that.

I'mm be seeing you again.

Yours for more science and less bull,

Paul Peebles

OIL PRICES *not* EXCESSIVE

By L. J. LOGAN, Associate Editor

IN THIS time of indiscriminate criticism of all existing prices as being too high, there is an urgent need of understanding and publicizing the facts regarding oil prices—for the good of the public as well as the industry. The fact that lumber prices are three times prewar does not mean that oil prices are excessive. And because prices of many foods are double their prewar level, a reduction of oil prices is not necessarily in order.

Prices of oils to the public have not increased sharply, and therefore no important reduction should be expected. For the industry's principal product, gasoline, the public now pays less than 20 percent in excess of the prewar price, and other products show similarly moderate increases.

Out of this modest advance in prices to the consumer, the industry must somehow cover greatly increased costs and solve serious and pressing problems of crude supply, pipe line construction, refinery expansion, and improvement of marketing facilities, if it is to keep on supplying all the oils needed. If there is a question about the economic soundness of present petroleum prices, it is whether they are adequate—not when or how much they can be reduced.

Yet there are definite indications that before this year is over, there will be a considerable number of instances in which oils will be sold at a loss to the industry, unless price increases are resorted to. Some companies already are sustaining abnormal costs, such as emergency tank car shipments found necessary to avoid local shortages. Similarly, rather than to fail in supplying customers, some companies will import their indicated deficiencies, even though transportation costs and unsatisfactory types of crudes involved will entail definite loss. At the same time, because of the scarcity of crude, many companies are putting heavy emphasis on secondary recovery, pressure maintenance, and other special efforts to increase the percentage of recovery of crude from existing fields, thereby committing themselves to more than ordinary costs. While oil companies will absorb extra costs temporarily rather than surrender business and customers, they cannot retain unprofitable business permanently.

During the war it was possible to meet essential (not all) demand by producing full-blast from crude reserves which in 1941 embodied the usual space producing ability normally maintained and by processing the crude largely in previously built refineries. But the handicaps of the war then prevented for several years the normal maintenance and expansion of reserves and facilities, and frozen prices and high wartime tax rates did not permit the accumulation of financial reserves adequate to cover the now inflated costs of the deferred work.

Thus it has come about that prices cannot be held down now by producing reserves that were not found and by operating pipe lines and refineries that were not built in 1942, 1943, 1944, 1945, and 1946. Instead, prices are forced upward by the necessity of trying to satisfy demand by depending too much on oil fields more than five years old and on pipe lines and refineries built before 1942. The demand exceeds the supply that can be maintained from those aging facilities, and efforts to supplement that supply include the previously mentioned abnormal steps and costs.

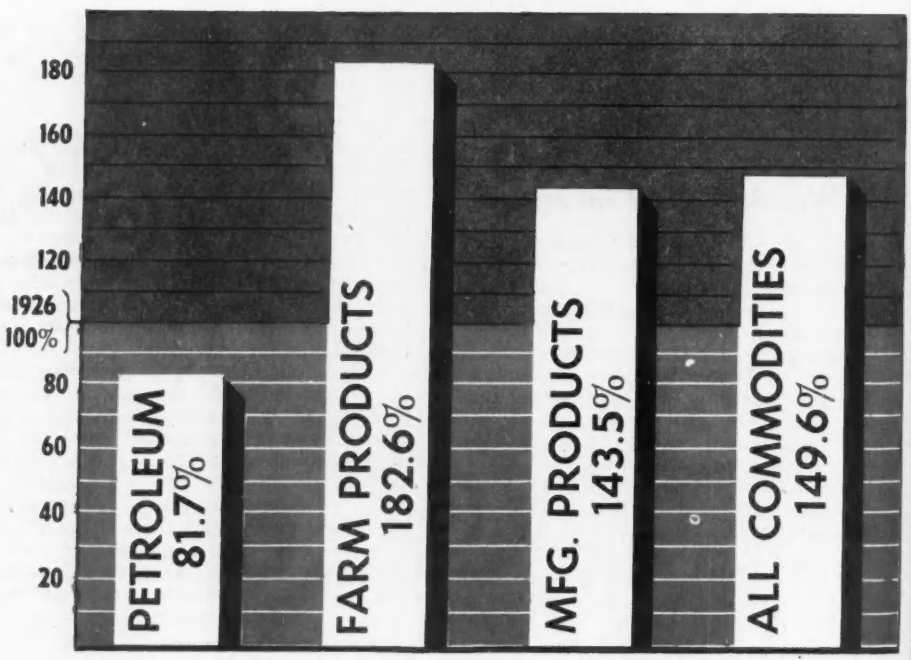
To supply the even larger demand just ahead, enlarged and improved facilities are now acutely necessary. To meet the prospective demand, companies and operators must be energetically busy today providing the necessary facilities. If existing and prospective prices are not sufficiently attractive, adequate facilities will not be provided.

By now it should be clear that the consumer cannot get what he wants simply by naming a price, unless the price he is willing to pay will draw forth production of the thing he wants—whether it is a beefsteak, an automobile, or a tank of gasoline.

The course marked out for the industry is to go ahead with all the work that is necessary; to hold down costs as much as it can; to maintain or reduce prices when, as, and if possible; but as a last restort, to increase prices if there is no other solution.

The course that the public must follow, for its own good, is to recognize the petroleum industry as its servant, holding a long record of faithfulness and efficiency—eager to serve but capable of its best effort when it is trusted, appreciated, and adequately rewarded.

Prices of other commodities have increased more sharply than petroleum



Pipe Lines of the U. S.

Ajax Pipe Line Corporation

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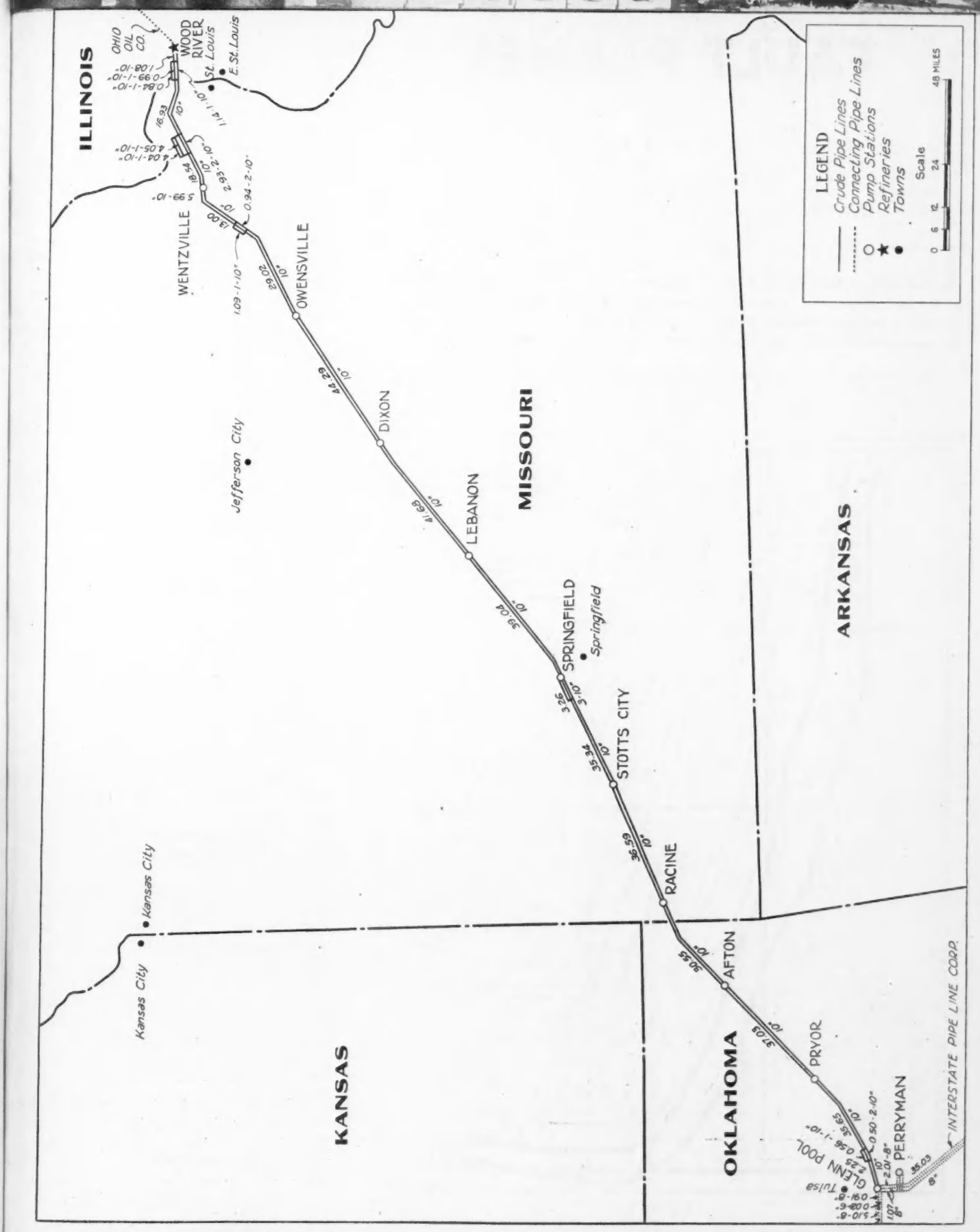


Contouring FAULT PLANES

By W. A. REITER

Consulting Geologist

LOCATION of fault points in terms of contours which represent the intersection of the fault plane with depth planes parallel to sea level enable the close approximation of faulted formations in the course of a projected well. The author outlines the procedure and illustrates the principle with typical fault plane contours.

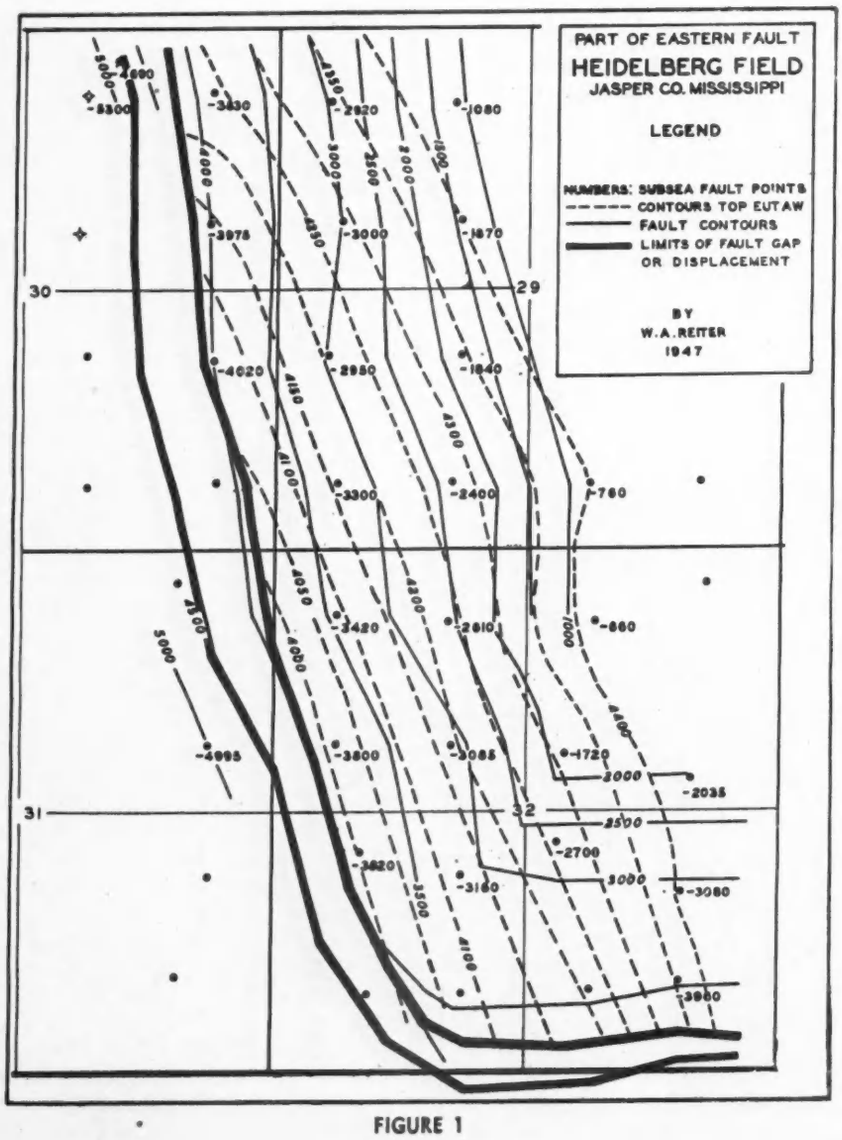


FIGURE 1

FAULT contours may be defined as lines representing the intersection of a fault plane and depth planes parallel to sea level. The technique of contouring fault planes can be helpful when drilling activities are affected by fault problems. The technique was first suggested to the writer when an operator several years ago made a location on the north side of the Sam Fordyce field, Hidalgo County, Texas. A cross-section involving the proposed location was made. This cross-section showed clearly that the well would miss the Sam Fordyce Sand on the up-side of the fault in the field and would also miss the sand on the downthrow side of the fault in the producing area known as the Sullivan City field; it was clear that the well would drill through the fault gap. An electrical log subsequently proved this prediction, and this problem and several other similar ones led to the idea of fault contouring.

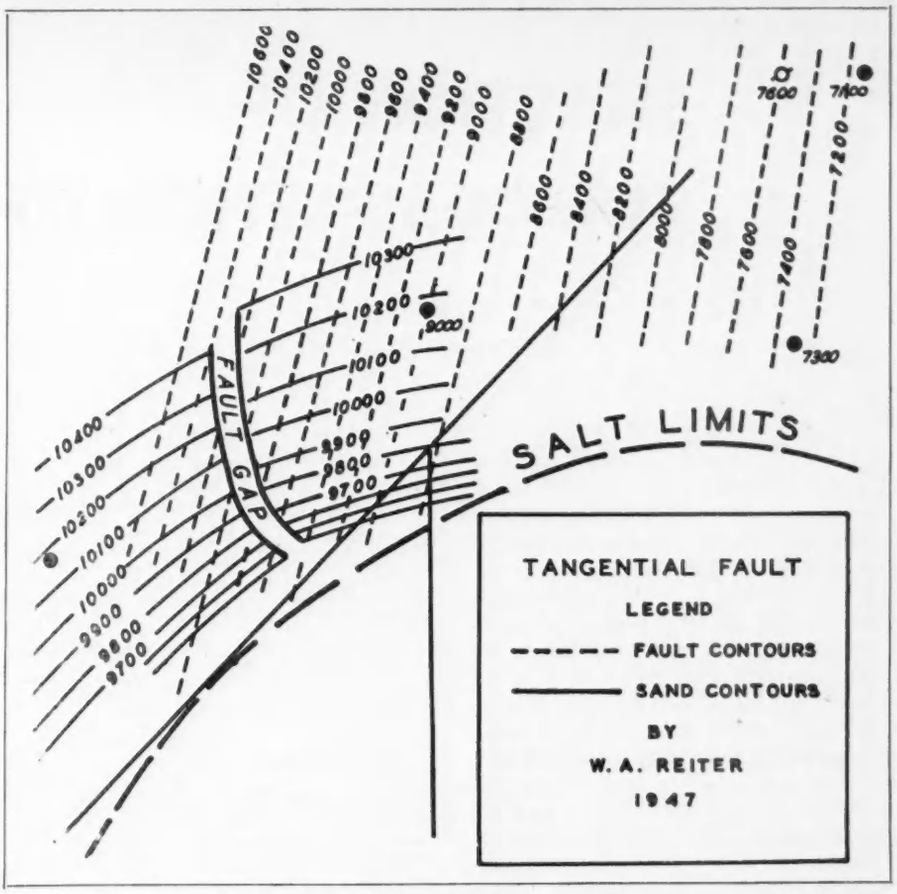
With increased use of electrical well records, geologists and engineers now are able to locate fault points with relative accuracy. This ability gives a clearer picture of fault patterns and enables one to contour fault planes. Cross-sections are of considerable value, but because of irregular well spacing, many times distorted views are obtained. Fault contouring eliminates this distortion, since most fault planes are comparatively smooth.

Fault contouring is sometimes helpful in determining the dip of the fault. It shows the width of the zone where the producing sand is missing. In complex faulting, it is quite helpful in locating points on the same fault. In addition, prediction of the depth at which a fault will be found in a proposed well can be made with a good degree of accuracy. Thus safer locations can be made in the desired segment.

The fault gap is defined as the inclined distance between upthrown edge of a given formation at the fault and the downthrown edge at the fault. This distance is the hypotenuse of a right triangle, with the side of the triangle being a vertical line from the upthrown fault point down to the base of the triangle, and the base of the triangle being a horizontal line from the downthrown fault point to the side of the triangle. The width of the fault gap when represented on a horizontal plane will be less than the actual fault gap, and if the dip of the fault plane is high, then this horizontal projection may be quite narrow.

When a formation is deposited it covers a specific area. Then assume the area to be uplifted, and it will be seen that the formation will cover a greater area. Since most formations are more or less rigid, tilting will occur and fault-

FIGURE 2



ing may result. If faulting does result, fault gaps appear. In a large percentage of structures, both tilting and faulting are found. The above is almost always true in an area of tension. If the fault is caused by the down-slipping of a given segment toward the basin, then the fault gap is caused by the lateral displacement of the formation basinward.

If the fault points are known in two wells and these points have a minimum difference of 200 feet it is possible, using the fault contouring technique, approximately to locate the position of the fault in a nearby proposed third well. In order to accomplish this, draft on tracing paper 100-foot contours representing the fault plane, using same scale as that of the map to be used whereon wells and proposed location are shown. Contours on the tracings should represent faults dipping at 50, 55, 60 and 65 degrees, these values covering the range of most faults. Then place singly each tracing representing the four different fault planes over the map in separate trials. Put contours representing depth difference in fault points on the correct wells, then a contour will fall on or near the proposed third well. This contour will give an approximation of depth where the third well will cross fault.

Figure 1 shows a part of East fault Heidelberg field, Jasper County Mississippi. This map shows clearly the contouring of the fault in this area. It shows where the fault is steep and also where the fault is dipping at an unusually low angle of 45 degrees. The fault gap at the top of the Eutaw formation in one place is 700 feet wide. Of course, this width only applies to each thin layer in the Eutaw. Since the Eutaw sands are 500 feet thick, the zone or horizontal gap of no Eutaw sands is only 200 feet wide. This fault is used as an example because although it is large the Eutaw sands are productive on both sides of the fault for 1½ miles.

Figure 2 shows a tangential fault flank piercement dome. This fault does not touch or reach the salt; it lies over it. Yet because the sands are parallel to the salt periphery the fault gap extends toward the salt.

Figure 3 shows a radial fault flank piercement dome. This fault abuts the salt. The sands become steeper as the salt is approached. This causes the fault to increase in throw and widens the fault gap nearest the salt.

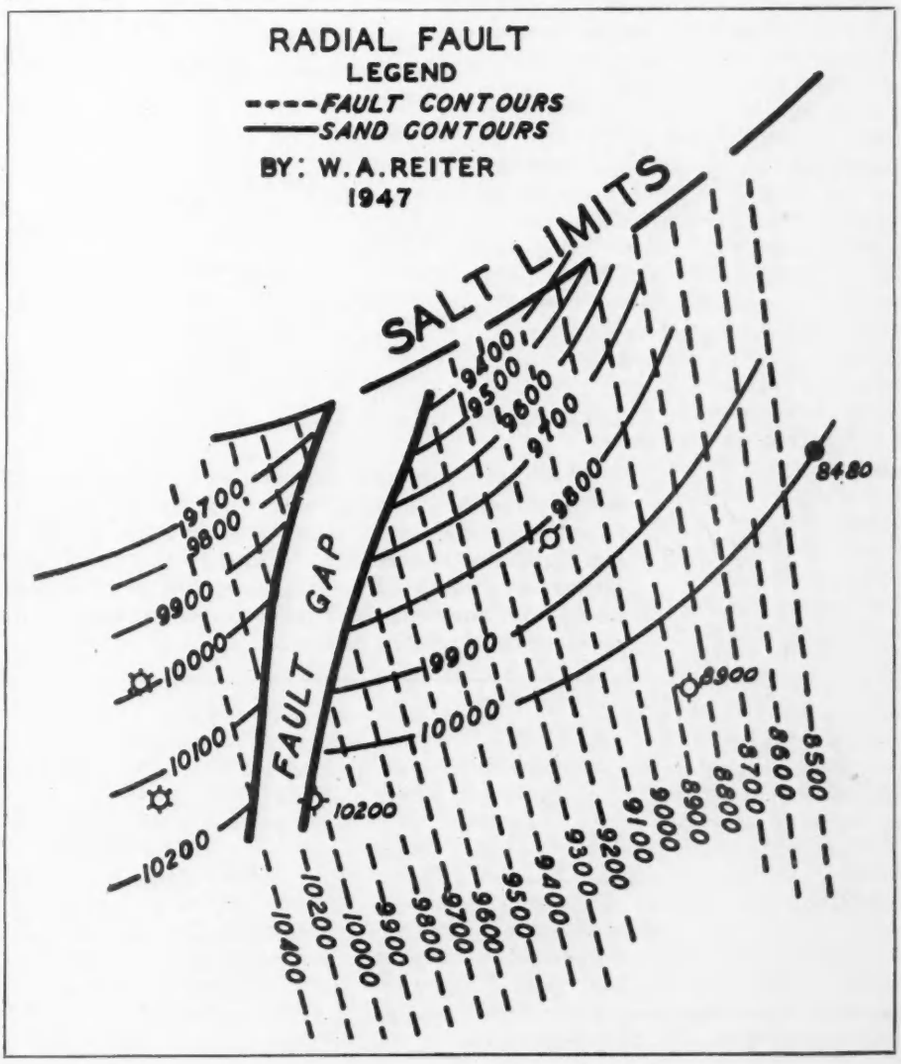


FIGURE 3

SELECTION OF *Mud Fluid* FOR COMPLETION OF WELLS

By H. E. RADFORD
Mechanical Engineer, Shell Oil Company

EFFORTS at improvement in drilling mud in the past have been inspired by two distinct and separate objectives. The first is the prevention of drilling difficulties such as stuck drill pipe or casing, loss of hole due to caving, excessive reaming or other mechanical troubles. The second objective is to improve productivity of wells. The latter involves protection of the oil sand during drilling against intrusion of mud particles or filtrates which may be harmful, and against formation of a mud cake on the walls which will clog the liner, and also includes the securing of a positive and permanent water shutoff by cementing. The second of these two principal objectives is the subject of this paper.

Early improvements in drilling muds were directed for the most part to the prevention of drilling difficulties because of the greater urgency involved as deeper wells were drilled and also because the payout on the effort and expense put into the care of the mud was very apparent in reduced drilling difficulties. In recent years we have found increasing interest in attempts to improve well productivities by careful selection and treatment of the mud. In this case the actual payout is less apparent and has been the subject of considerable discussion.

The use of special muds to improve the production of wells has been the subject of many excellent papers. Laboratory work has shown the detrimental effect of water[1,6] and mud particles[2] on the permeability of sands. Water appears to be most damaging in the case of sands containing hydratable material, but there are other contributing factors, such as the Jamin effect and deposition of solids. Likewise, field results in general tend to confirm that use of special muds and completion procedures which reduce water intrusion to a minimum or eliminate it altogether results in wells having higher productivity.[2,3,4,5] As might be expected, the evidence of improvement from use of oil-base mud has been more apparent than is the case with the special water-base muds and the relative value of the various water-base muds has not been too clearly established.

TABLE 1
Two Wells Showing Influence of Water Block

Well (a)	Well (b)
Interval open—121′	Interval open—54′
Time formation exposed to mud—5 months	Time formation exposed to mud—2 weeks
Initial production before deeping—1100 b/d flowing	Not deepened—Normal completion
Initial production after deepening—25 b/d pumping	Initial production 1300 b/d flowing
Max. pumping rate reached ed after 9 months pumping —67 b/d	Flowing rate after 9 months —134 b/d
Total gross production—88,000 bbls.	Total gross production—98,000 bbls.
Economic life—11½ yrs.	Economic life—4½ yrs.

Selection of Mud

Field data collected subsequent to the publishing of the above papers tend in general to support their basic conclusion that infiltration of water is harmful.

One of the most outstanding examples of the effects of water blocking as shown by field evidence is shown by a study of the production figures for two offset wells in a San Joaquin Valley field (A) shown in Table 1.

In this case only these two wells were drilled to the particular zone in question, both with water-base mud. In the case of one well (a), due to deepening and plugging operations, the oil zone was open to water infiltration from the clay-water mud for five months. Before deepening, this well flowed at the rate of 1100 barrels per day. When finally recompleted, after the five-months' period, its initial rate was 25 barrels per day, pumping. This rate gradually built up to 67 barrels per day after nine months pumping. During an economic life of 11½ years the well produced 88,000 barrels of oil.

Two Wells Compared

The offset well (b) was a normal completion and the oil zone was exposed to clay water mud for only 2½ weeks. It was completed as a flowing well, 1300 barrels per day initial production. It flowed for 13 months, during which it tanked 80,000 barrels of oil. During the remaining 3½ years of its economic life it produced an additional 18,000 barrels to reach a total production of 98,000 barrels. This was in spite of the fact that the amount of interval open was only 54′ for well (b), as compared with 121′ for well (a).

Thus based on interval open, well (a) should have produced at least twice as much oil as well (b). In addition, all of the oil produced by (a) had to be pumped, which involved production expense while 80 percent of the oil from (b) was produced during its flowing period. While this is admittedly an extreme example of damage to a productive zone, it does clearly demonstrate that such action takes place.

More often than not it is found that use of special muds, particularly oil-base mud, increases initial productivity of wells, as compared with normal water-base mud completions and the improvement appears to be permanent over the life of the well. It is for this reason that oil company managements have sanctioned the use of special muds and their development has been rapid. The problem today is to select the proper mud from the many available types to fit the conditions found in a given well. In this paper an attempt has been made to present the available data on these various special muds to assist in

Mud fluid can damage the productive formation and seriously affect the productivity of a well. The principal objective in selecting a mud for completion work—as distinguished from the fluid best suited for drilling to the productive zone—is to obtain exclusive advantages of the special fluid. The author points out characteristic advantages of special muds, and indicates possible fields of use.

their proper selection and use. Examples are given of effective use of the various types.

Normal Clay-Water Muds

Normal clay-water muds serve as the yardstick by which we compare the special muds. Their performance under well conditions is better understood than that of the latter. It is well known that as drilling proceeds, a filter cake is built up on the walls of the formation. Surprisingly enough, for a very wide range of permeabilities, say from 1/10 millidarcy to 10,000 millidarcys the formation permeability has no effect on the mud sheath thickness or filter loss. This is due to the fact that the permeability of a mud sheath itself is of the order of 1/1000 to 1/10,000 of a millidarcy. Thus the mud sheath itself takes control of the filter, process except in the case of relatively impermeable formations having 0 to 1/10 millidarcy permeability or for very porous formations where complete loss of circulation is experienced. We can conclude that opposite a shale having effectively a zero permeability no true mud sheath is formed. It is possible for a shale section to become plastered with cuttings, however, just as a drill collar or bit becomes "balled up."

The influence of varying pressure on thickness of mud sheath and amount of filter loss for normal muds is such that as an example, a six-fold increase in pressure differential may increase filter loss by only 30 percent. This is due to the fact that mud sheaths deposited by normal clay-water muds are found to be compressible in the manner of a sponge. Increasing pressure reduces their permeability which tends to curb the increasing filter loss. This action is reversible. The actual compressibility of different mud sheaths varies considerably. In general, the more colloidal muds show the greatest compressibility of mud sheath, whereas muds having a high percentage of inert material such as weight material deposit cakes which show the least compressibility.

All normal clay water muds are subject to an increase in filter loss with increase in temperature due to the decrease in the viscosity of the filtrate which is water. Thus, theoretically the amount of filtrate should vary inversely as the square root of the viscosity of water. Additionally, some muds suffer from high temperature flocculation. A typical filter loss temperature curve for clay-water mud appears in Figure 1.

Normal clay-water mud is still considered satisfactory as a completion fluid in some cases, such as where the sand is but little affected by water due to lack of hydratable material, and where time and depth factors are such that but little water is lost in any case. Also, some wells are completed in wet zones and they necessarily become flooded with formation water during shutdowns of production. In such cases it may be futile to protect the sand with special muds during drilling.

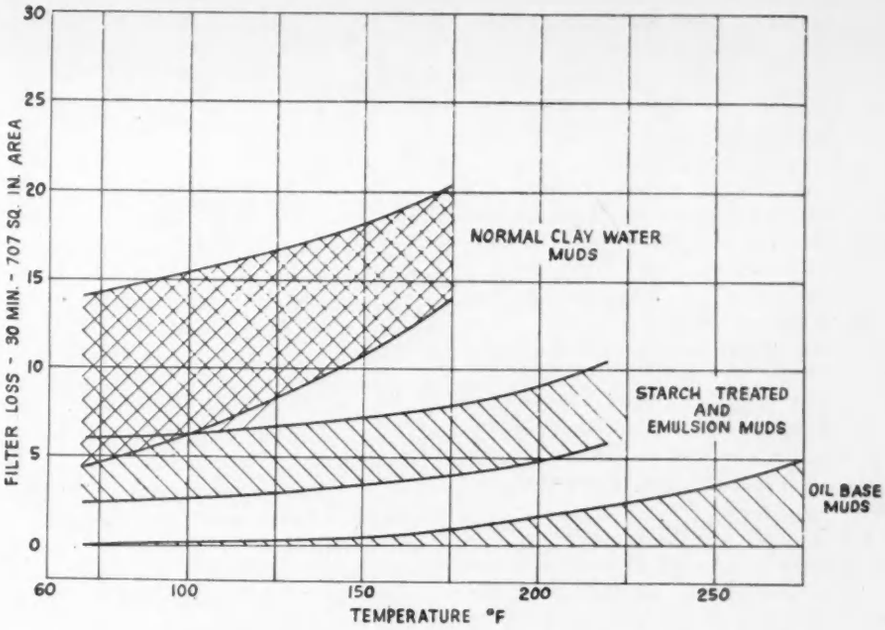


Figure 1. Effect of temperature on filter loss values for drilling muds (500-pound differential pressure).

Drilling Emulsions

One of the simplest ways of improving filter loss to a point beyond that possible by normal chemical treatment is to emulsify a certain percentage of oil into the clay-water mud. Such a mixture has been used to very good advantage in the prevention of drilling difficulties and also has some application as a completion fluid.

The filter loss can be brought down to a very low figure (+1cc API) at room temperature. The filtrate is normally either clear water or water with a low percentage of emulsified oil. The mud sheath deposited is oil impregnated and has a soft texture. As with all water-base muds there is a rather rapid increase in fluid loss with increasing temperature as shown in Figure 1. Comparative costs per barrel for this mud, as well as other special muds, are shown in Table 2.

TABLE 2
Costs

Type of Mud	Average Cost Per Barrel	Salvage Value After Use
Norman clay-water mud	$0.50–$1.00	Good
Drilling emulsions	$1.50–$3.50	Good
Starch muds	$2.50–$3.50	Poor for some types—good for others
Carboxymethylcellulose muds	$3.00–$4.00	.....
Crude oil	$1.50	Good
Oil base mud	$8.50	May require reconditioning

One operator in a shallow field in the Los Angeles Basin has had good success in using a light mud composed of approximately 50 percent clay-water and 50 percent crude by volume treated with an emulsifier. The filter loss is thereby reduced to ±1cc API. This mud has been used with success in wells where it is necessary to set gravel-packed liners, the procedure being to set the liner and to then wash thoroughly through and behind the liner with crude oil. Most of these wells are pumped and comparative productivity indices have not been obtained.

Emulsions have the advantage of relatively low cost, ease of handling, good conductivity for electric logs, and deposit a soft easily decomposed mud sheath. The advantage or disadvantage of having a filtrate with a low surface tension, such as these muds often have due to the presence of the emulsifier, has not been thoroughly explored.

Starch Muds

Of the various organic colloids available, starch has been the most common additive for water-loss reduction. Starch is adaptable to mixing in the following ways:

1. Low pH fresh-water muds with preservative.
2. High pH caustic mud without preservative.
3. High pH lime-base mud without preservative.
4. Salt-water-base mud with preservative.

Filter losses at room temperature as with the emulsions can be made very

low and typical high temperature characteristics are shown in Figure 1.

One of the best applications for a starch mud occurs where it is desired to drill through the oil sand before setting a water string and then to cement a solid string of casing on bottom for selective gun perforation. The starch mud can be handled safely and economically with long sections of open hole, it tends to protect the sand with its low water loss, and particularly in the case of the lime base mud provides a compatible fluid for cementing. Obtaining a successful primary cement job over a long section of casing is aided materially by use of a low viscosity, low gel mud which will not thicken when contaminated by cement.

Starch muds can be prepared so that the filtrate will match formation water in salt content and although this has theoretical advantages, field evidence as to its value has not been encouraging.

Field results comparing well productivities in a relatively deep zone in San Joaquin Valley Field (C) for wells completed with oil-base mud, starch mud, and water-base mud are shown in Table 3. In the case of the starch mud the productive zone was drilled with freshwater starch mud and was reamed from 8½ to 11 inches while using 1000 grain sal-water starch mud.

Carboxymethylcellulose Muds

An organic colloid named carboxymethylcellulose[7] is coming into use in the Mid-Continent area as a water-loss reducer. The material is not fermentable and does not require maintenance of a high pH. It has been found useful in preparation of salt-water muds having a low water loss.

It has not been used extensively in areas where productivities can be compared.[8] Also because of limited manufacturing capacity the cost per pound of the material is high at present (70 to 75 cents). Its use is mentioned in this paper in order to cover completely the list of available muds.

Crude has been used rather extensively in the past as a completion drilling fluid in shallow zone drilling. This procedure is limited to fields where pressures are low and where no difficulty is experienced with caving shale. Straight crude has no plastering properties but when mixed with cuttings and formation fluids it acquires some plastering ability.

In one shallow (2000-4000-foot) field (D) in the San Joaquin Valley results were studied in a group of 56 wells, among which 19 were completed using crude as a drilling fluid, 18 with water-base and 19 with oil-base mud. Pressure and permeability measurements were not available so that the comparison was on a production factor per foot of sand basis. Results tended to be erratic but showed a trend in favor of oil as compared to water-base mud, both initially and after one to three years production. The choice between oil-base and crude was inconclusive.

Oil-Base Mud

Oil-base muds have characteristics which in general make them very useful as a completion fluid. They have the lowest filter losses and therefore the thinnest filter cakes of any of the mud fluids, particularly under well conditions (see Figure 1). Also, the filtrate is oil which is not harmful to the formation.

Principal disadvantages are the high cost per barrel, the special care and procedure required in their use at the well, and the fact that oil-base electric logs are not equivalent to water-base electric logs in every respect.

Although cementing in oil-base mud involves the hazard of contaminating the cement with oil, this is offset by the fact that holes drilled with oil-base are usually true gauge, without washouts, and the mud having a low gel strength can be displaced freely from the well.

As mentioned before, numerous examples can show by field data that initial productivities can be improved through its use. As to the permanence of the effect, a study of wells in San Joaquin Field (E) indicates that it extends over at least a substantial portion of the life of the well. In this field excellent information in regard to permeabilities and pressures is available for comparison of four water-base and four oil-base wells. Initial specific productivity indices for oil-base mud wells range from 50 to 200 percent higher than those of the clay base wells. After a period of six to seven years this relationship still exists.

A recent excellent example of the application of oil base mud to a specific problem occurred in a Coastal Field (F). A high-pressure zone consisting of fine grained sand of low permeability is located at 9000 feet ±. When completed with conventional 90 to 100-pound muds and conventional liners, the wells tend to fill in with sand, thus blocking production. Various liner perforation sizes from 40 mesh slots to ⅜-inch-round holes have been tried. It was not thought advisable to use finer mesh perforations with clay-water muds because of the possibility of the liner becoming clogged with mud sheath. A recent well in this zone was drilled with oil-base mud, and a .015-inch mesh slotted liner was run. No washing behind the liner was attempted because of the high pressure of the zone, but the well was completed satisfactorily with an initial productivity index approximately three times better than nearby water-base completions and with indications of improved sand exclusion.

TABLE 3
Field C
Productivity Indices for Wells Completed with Clay-Water Oil-Base and Starch mud

Type Completion	Initial Productivity Index	Initial Specific Productivity Index
GROUP 1		
Well A—Water-base	0.63	.00243
Well B—Water-base	0.46	.00173
Well C—1000 gr./gal. starch	1.18	.00453
Well D—Oil-base	1.22	.00500
GROUP 2		
Well A—Water-base	0.46	.00159
Well B—100 gr./gal. starch	0.33	.00118
Well C—Oil-base	0.35	.00125
Well D—Oil-base	0.84	.00307

Conclusions

Substantial field evidence exists to show the harmful effects resulting from contact of normal clay-water muds with an oil sand. It would, therefore, be logical from a technical standpoint to use either oil-base mud or crude as a completion fluid in every well to avoid any infiltration of water into the sand. From a practical standpoint, however, cases are found where either normal clay-water mud, or one of the special water-base muds such as drilling emulsions, starch mud, or carboxymethylcellulose mud can be used logically and on a sound economic basis. The selection of the particular special water mud to use requires analysis of well conditions to be met, and adaptation of the mud best suited to those conditions.

Under circumstances where sands have low permeability and at the same time are strongly affected by water, or where a particularly thin mud sheath is required, use of oil-base mud is definitely indicated and the payout is apparent.

Acknowledgment

Appreciation is expressed to Shell Oil Company, Incorporated, for permission to publish this paper. Special acknowledgment is made of suggestions and data received from other oil companies and their personnel.

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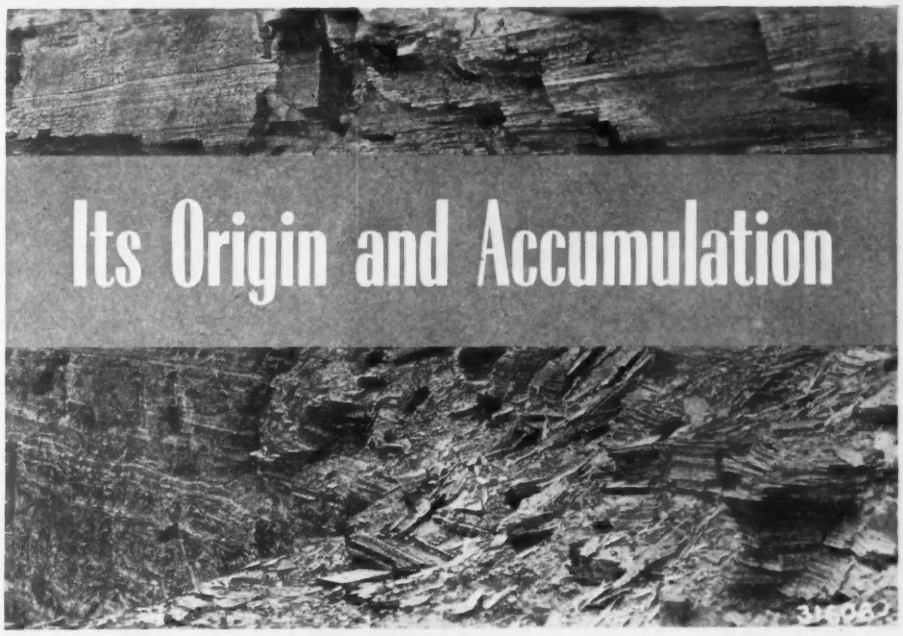
Oil

Its Origin and Accumulation



Part I

By DR. F. M. VAN TUYL and DR. BEN H. PARKER
Colorado School of Mines, Golden, Colorado

SOME years ago the authors, after compiling the essential facts and working theories from the literature, became convinced that the fundamental concepts bearing on the origin and accumulation of petroleum and natural gas needed reorganization and coordination in the light of new developments, so that the information might be utilized more satisfactorily in the scientific exploration for and development of petroleum reserves.

In order that the study might be as complete as possible it was concluded that leading workers in the field of petroleum geology should be requested to contribute facts and theories based upon individual experiences in widely diversified situations that might be used to weigh the explanations previously set forth in literature. Through the cooperation of the Research Committee of the American Association of Petroleum Geologists, valuable suggestions as well as relevant facts based upon field occurrences were obtained both through a questionnaire and through study-group discussions at several annual meetings of the society. The pertinent material so obtained after coordination with data culled from the literature has been published in the form of two reports[1,2] sponsored by the Association.

In order that the material may be brought to the attention of as wide a circle of oil men as possible, some of the more important deductions and conclusions based upon the study in "The Time of Origin and Accumulation of Petroleum and Natural Gas" are set forth here. It is hoped that renewed interest may be created in the problems presented, and that more careful field observations coupled with free discussions of the data eventually will lead to the solution of some of the baffling relations encountered in this field of investigation.

The problem of source beds. The source of the oil and gas in most oil pools has not yet been determined with a reasonable degree of assurance. Marine shales are considered to be the most common source rocks. In a few instances a profusion of skeletal elements of certain organisms, or shales or limestones containing a large amount of unidentifiable organic matter, or even an appreciable quantity of viscous bitumen, are in such association with the oil horizons that the derivation of the hydrocarbons from them is almost indisputable. The close relation of some oil reservoirs to dark shales such as the Chattanooga and Cherokee appears to be significant. However, the time-worn conception that all black shales are or have been potential parent rocks of oil and gas is apparently subject to revision. In many highly productive areas either no dark shales are present in the section or they are so far separated stratigraphically from the reservoirs as to preclude the view that they are the source of the hydrocarbons. Carbonization does not appear to be a necessary concomitant of the transformation of organic debris to oil and gas.

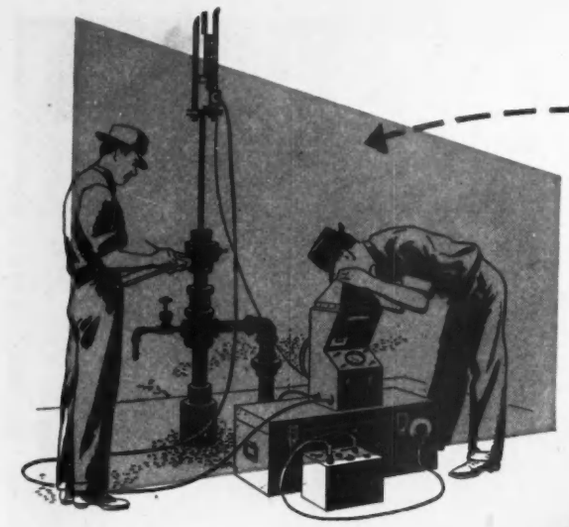
Shales rich in pyrobitumens (oil shales) are not necessarily good source beds.

ORIGIN and accumulation of oil are twin phases of a problem which not only is still a puzzle to geologists and students of earth developments, but which also is of prime importance to the executive charged with the responsibility of future oil operations of his company. The authors review existing literature on the subject, and postulate some interesting and novel hypotheses as they trace the changes in trend of thought regarding petroleum and its derivation.

One of the most puzzling questions that arise in connection with the transformation of organic material into oil and gas is this: Why does the organic matter change to oil under certain conditions and to pyrobitumen or perhaps to both under other conditions?

Organic material in marine limestones and sandstones, as well as in continental clastics laid down in lakes, is unquestionably a source of both oil and gas. The possibility that plant and animal matter deposited in large amounts in limestones and sandstones may be the chief source of oil or gas or of bitumen now found in such strata should be weighed carefully. Many occurrences of oil and gas, explicable with difficulty on the basis of the shale source-bed theory, become more understandable on the assumption of an indigenous origin. A discussion of this phase of the problem, submitted by Walter K. Link, is so pertinent that it is herewith reproduced.

"There is one phase of the question



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of oil generation that we should not overlook, namely, the possibility that oil was generated in the reservoir in which it now is found. Anyone who has done work along the present seacoast, where deposition is going on, where deltas are being formed, and where reefs are being built up, cannot help but see how possible it is to have oil formed in the reservoir itself. This is especially true in the warm waters of the tropics today. Along the coast of Celebes, Boetoeng, Moena, and other islands of the East Indies, great modern coral reefs are building up. Some of these reefs are now 700 meters above sea level and have been tilted but a degree or so; on the face of them one can count as many as 15 well-developed terraces. Where these reefs are being deposited, the waters are teeming with plant and animal life, much of which becomes lodged in the cavities of the reefs. These coral reefs that are being deposited are generally not a solid homogeneous limestone, but have great holes in them so that they are more than honeycombed; in fact, they contain small caverns. In these holes great amounts of silt and organic remains become caught and disintegrate so that much of the "lime" has become discolored to a dirty brown and black.

"I should like to point out that if submergence rather than emergence would take place, and if these reefs were covered fairly rapidly with sediments, no matter what their nature, either continental or marine, these buried reefs would be not only potential oil sources for generations, but at the same time the reservoir in which the oil generated would collect.

"This also holds true for actual sands that now are being deposited. I do not refer so much to the clean sands one finds in bars along the coast where ocean currents shift them around and wash them clean. The deltas of many small island rivers in Borneo, Sumatra, and on the smaller islands, are built up of sands, muds, and silts. These sands are not clean white sands, but are dirty with decaying tropical vegetable and animal life. I think that there is enough organic matter in those sands alone to generate oil, and the chances for such oil to remain in the sand body itself until folding created a structure causing migration and concentration are more logical than to explain migration of oil from shales above and below into the sand bodies."

Continental sedimentation, particularly in certain lakes, affords conditions favorable for the burial of large amounts of source material, and evidence is accumulating that certain commercial oil and gas pools in the Wasatch formation of the Rocky Mountain region are of this origin.

Derivation of oil of discontinuous reservoirs. Oil accumulations in discontinuous reservoirs, either in the form of local porous zones in limestones, or of lenses, shoestrings, and similar bodies of sandstone in shale are best explained on the assumption that the source material was deposited (1) in the reservoirs themselves, (2) in the inclosing shales, or (3) in both. In short, the theory of local origin of the oil appears best to fit the facts. This is especially true in those areas where no evidence of fracturing has been found and the waters of nearby porous zones are of a substantially different composition.

In individual instances a comparison of the micro-organisms in the residues of the oils from such sands with those in the associated sediments, using the method established by Sanders (discussed under "Conclusions") should aid materially in determining their source.

Multiple oil and gas horizons. It is difficult to escape the conclusion that there has been intercommunication between the oil zones of certain oil fields in which there is a close similarity in properties of the oils of several horizons. This is especially true where fracturing or faulting is known to have occurred. However, the contention that in such areas the oil is all from one source does not appear to be justified.

Contrariwise, the acceptance of the view that oils of unlike properties in several productive horizons of the same oil field are of separate origin is usually favored; but this interpretation cannot be adopted as a premise until more is learned experimentally and otherwise: (1) concerning the effect of ground water of variable composition upon oils of different grades; (2) the influence of

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Dr. Parker was a member of the faculty as associate professor of geological engineering from 1933 to 1943 except for the school year 1939-40, when he was on leave of absence to serve as assistant chief geologist for the Argentine government oil fields with headquarters in Buenos Aires.

At the time of his appointment as president of the Colorado School of Mines, he was vice president of the Frontier Refining Company. From 1924 to 1931 he was actively engaged as petroleum geologist in Oklahoma, New Mexico, Utah, Wyoming, Kansas, South Dakota, Texas and Colorado. He also was part owner and operator of mines in Colorado, and a member of the firm of Parker and Boyd, consulting mining engineers, as well as an officer and director in several mining and petroleum production organizations.

Dr. B. H. Parker

various kinds of sediments, both wet and dry, upon oils migrating through them; (3) the changes that take place in oils as a result of variations in heat and pressure accompanying differences in depth of burial; and (4) the influence of geologic age upon the grade of oil.

Significance of pyrobituminous shales. A study of the data on this phase of the subject leads to an appreciation of the probable importance of pyrobituminous shales as mother rocks of petroleum in many areas. Most oil shales, however, either where they are encountered in drilling operations or at the outcrop, contain little or no ether-soluble material at the present time. Even in those instances where a coloration of the solvent is obtained generally it has not been proved that the soluble material is not a variety of kerogen less refractory than usual instead of free oil. If oil has been generated in appreciable quantities in oil shales it evidently migrated from them rather early in their history, perhaps at the time of their compaction. If kerogen is now being transformed to oil, as some geologists believe, it is reasonable to suppose that much of the bitumen should be retained by the sale, especially where the shale is dry and adhesion would play an important role.

The fact that some oil shales of the Appalachian and Rocky Mountain areas, although they have undergone considerable metamorphism, still retain a substantial amount of kerogen, weakens at least the geologic-distillation theory of the origin of oil and gas.[3]

Brooks[4] states that kerogen is composed of refractory materials, which will not change to oil under conditions that would normally be expected to prevail in the outer portion of the earth's crust.

Unchanging Substances

The conclusion seems unescapable that organic materials as stable as the paraffins, the waxes such as the Montan waxes, kerogen, and the resins, once formed and sealed in the sedimentary rocks, undergo no further chemical change whatever under the conditions of temperature and pressure existing in sedimentary rocks even of great geological age and depth.

It has been demonstrated that igneous intrusions have distilled oil and gas from oil shales, and methane is known to be released during the normal process of devolatilization of terrestrial vegetation long after burial. Oil shales may yield a similar product, though it has not been demonstrated that petroleum can be produced from kerogen except at temperatures well above those normally encountered at the depths at which oil has been found in commercial quantities.

Present-day generation of hydrocarbons. It is well known that methane is being generated today under many environmental conditions. The perplexing question concerning the probability that protopetroleum or even petroleum is being formed in modern seas or lakes remains unsolved. Oily substances and viscous waxlike materials, some of which are known to contain hydrocarbons, occur both in organisms and in modern sediments. Furthermore, a substance considered to be primary asphalt has been found in recent deposits. But no undoubted petroleum, except perhaps certain disseminated gobules of possible sedimentary origin, has been found in deposits so young. More definite information on this subject must await additional study of the hydrocarbon content of living and dead organisms; of ether-soluble materials in algal incrustations such as coörongite; and of oily material in muds on the floor of the sea, including samples obtained from a depth of a number of feet in bottom oozes rich in organic material, such as those of the Black Sea of which as much as 10 percent of the organic matter will dissolve in petroleum solvents.

Oil in late Tertiary and Quaternary Sediments. In analyzing the data concerning the occurrence of oil in Late Tertiary and Quaternary sediments, we are confronted with two fundamental questions: (1) Is the ether-soluble material either wholly or in part a mineral oil? (2) Is there conclusive evidence that the oil was generated within the formations in which it now occurs?

The answer to the first question hinges upon a careful examination of the oil by an organic chemist; the second calls for a thorough study of the geology of the deposits involved. The possibility of extraneous oil being trapped by falling mineral particles is everpresent. The chances of contamination by seepage from deeper-lying formations are also to be considered.

It would appear from the geology and biology of the area that the Pyramid Lake, Nevada, occurrence offers an ideal situation for further investigation in an effort to solve the problem of the time of origin of petroleum. Particular attention should be directed to the characteristics of the oil, the nature of the source material, the microflora present, and the variations in the constitution of the oil with depth.

Brooks,[5] in a discussion of the composition of protopetroleum, says: "Such an oil would probably contain higher proportions of naphthenic or other organic acids than known petroleum; probably less hydrocarbons such as gasoline; high-boiling, unsaturated hydrocarbons of the ethylene type; and be associated with more or less solid organic material. In fact, the bitumen we know generally under the name of asphalt should repay investigation from this point of view."

He evidently has in mind asphalt occurring in such situations as to indicate that it may be of primary rather than secondary origin. Most so-called asphalts are known to have resulted from the inspissation of asphalt-base oils.

A study of the evolution of the Gulf Coast crude oils led Barton[6] to conclude also that the ancetral crude of that area might be "a heavy oil, which under the United States Bureau of Mines method of analysis would consist of residuum. Oils of that type should be too thick and viscous to move except through open channels. They may never be found in appreciable accumulations and may have to be sought as droplets scattered through the source formation."

The accumulation of oil in inclosed reservoirs. Many of the supposed discontinuous reservoirs of petroleum are probably not completely inclosed and these do not afford valid evidence bearing on the time and cause of oil accumulation. In a few instances, however, there is evidence of isolation of porous zones in limestones and of sand bodies in shales. The only logical explanation of the concentration of oil in the latter is by generation of oil in the reservoirs, or by displacement of water once present in the pores of the sands by oil through interchange and compaction, both of which evidently take place comparatively early. Those occurrences in which inclosed reservoirs are largely or completely filled with oil can scarcely be explained on the assumption of an indigenous source, for the reason that sands and sandstones are nowhere sufficiently rich in organic matter for such a large volume of oil to be formed.

Time of cementation in relation to time of accumulation. Occurrences of oil and gas in sands free of binding material appear to be rare, and may result from early accumulations, which would prevent the entrance of water containing cement, or from the later concentration of the hydrocarbons in sands in which little or no binder was ever deposited.

In those oil and gas pools occurring in sands containing chemically deposited cement, either widely diffused or in local "tight" areas, it is obvious that circulating waters, either connate or meteoric, occupied the pores for a time at least after some compaction had occurred and prior to the introduction of the hydrocarbons. Unfortunately, little is known regarding the time and conditions under which cementing materials are deposited in sands while they are still beneath the sea. Certain limestones such as reef rocks apparently undergo considerable consolidation as the material accumulates. It is generally agreed that circulating meteoric waters may be very e

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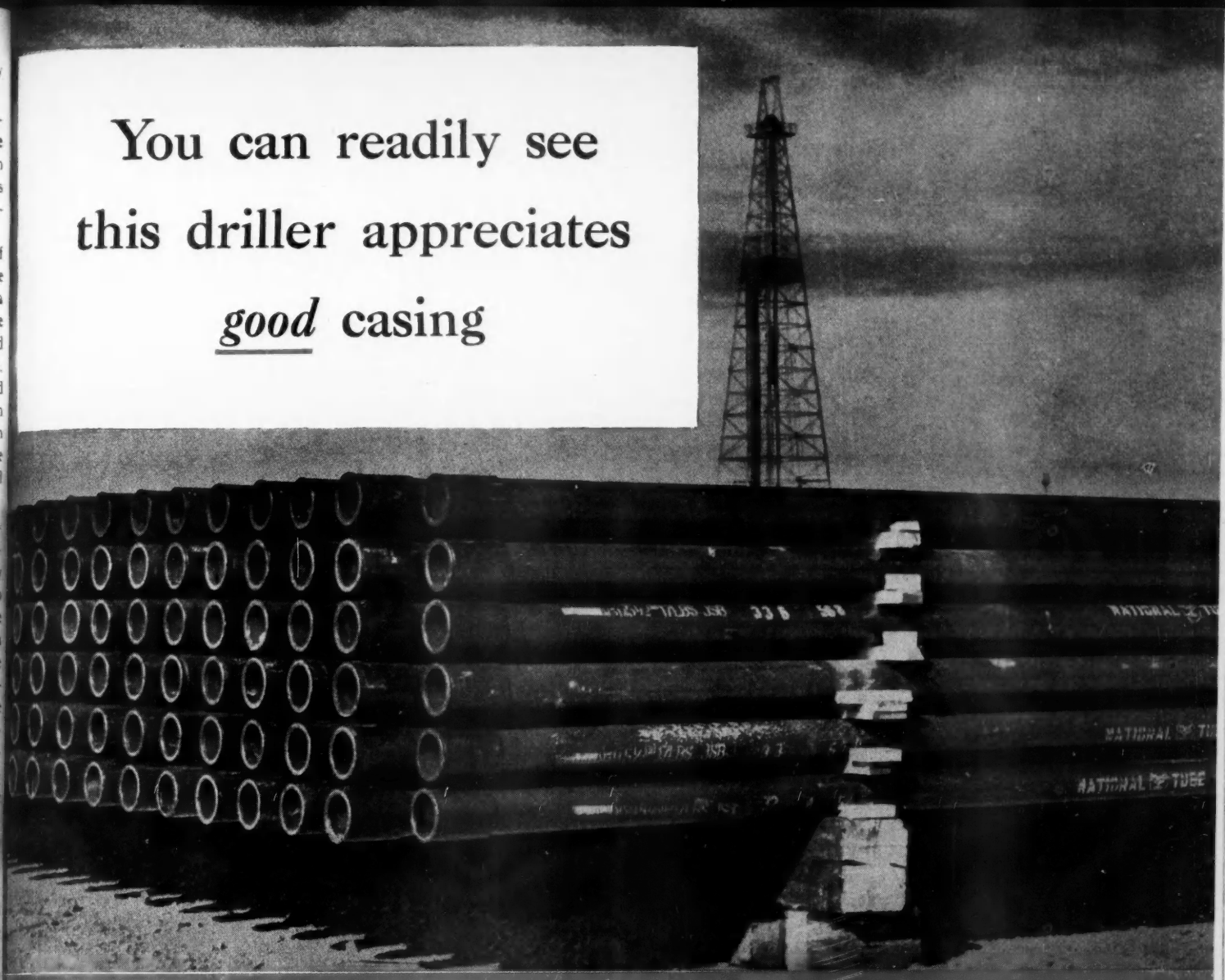

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fective in consolidating sandstones after the strata have become a part of the lands.

"Tight" areas immediately surrounding productive areas either in sandstones or limestones have undoubtedly resulted from postaccumulation cementation in many instances.

On the whole the present data do not offer much assistance bearing on the time of accumulation except to indicate that oil and gas ordinarily do not become concentrated until some consolidation has occurred. Some of the most interesting evidence is supplied by limestone reservoirs in which calcite has been deposited in the cavities. When occlusions of oil occur in the calcite crystals or gas is contained in sealed cavities, there can be no question as to the relative time of accumulation of the hydrocarbons as compared with the time of cementation. Even in such instances, accumulation in solution cavities could not have occurred until after the limestone had become consolidated.

Time of folding as compared with age of source beds. A review of the data elicited by this question furnished convincing evidence that petroleum may accumulate either early or late in the geologic history of the strata in which it is now found. In the interpretation of the relationships described the fact should be kept in mind that late accumulation does not necessarily indicate late generation of petroleum, although this would appear to be the simplest explanation. Perhaps some oil and gas were generated early and remained disseminated for a long time prior to the development of a favorable trap in which they might be concentratetd or of structural conditions favorable for migration.

Recurrent Folding

In areas of recurrent folding, where structures may have been formed and the reservoir truncated one or more times prior to the accumulation of oil and gas, an even more complicated explanation would appear to be necessary. Repeated and prolonged generation of oil and gas are of course within the realm of possibilities. An alternative hypothesis might be based on the assumption that the oil in such structures was derived from formations overlapping the truncated strata.

Depth of burial required to generate oil. The geologic relations of some productive areas, as deduced through paleogeographic, structural, and other reasoning, suggest that petroleum under special conditions may be formed and accumulated at depths of less than two thousand feet. In other instances, much deeper burial must have occurred prior to migration and concentration of oil and gas for the reason that favorable traps were not developed until several thousand feet of sediments were laid down over the present reservoirs. In the latter occurrences the time of origin of the oil cannot be determined. It may have been early or late. It is not logical to assume that all shallow occurrences have resulted from the erosion of a thick overburden or from vertical migration from deep-seated sources. This is especially true where oil occurs in shallow, discontinuous sands intercalated with water sands in areas showing no evidence of faulting or erosion of consequence.

Recurrent folding and accumulation. It is well known that many oil structures in Kansas and Oklahoma have experienced repeated folding. There is evidence of the generation of oil during at least two different times in the history of this area. It cannot be proved that any of the present oil accumulations in Ordovician strata in the Mid-Continent region are derived from rocks of this age, though the relations in some pools point strongly in that direction.

The evidence that oil has been concentrated during more than one epoch in other petroliferous areas is suggestive but not conclusive. The importance of recurrent folding in petroleum geology is becoming more generally realized.

Recurrent uplift with concomitant intensification of upfolds favors the development of reservoirs: (1) by the fracturing and solution of lime-stones; and (2) by producing favorable environmental conditions for the deposition of porous marine sands. It also yields appropriate local conditions for the deposition of source materials for oil and gas as suggested by Frank R. Clark.[7]

Source and age of Ordovician oils of Kansas and Oklahoma. It is obvious that there will be no general agreement on this important topic until more convincing evidence is brought to light as a result of additional subsurface and other investigations. Further study of the chemical and microscopic characteristics of the crude oils from the Ordovician and younger formations of selected areas may throw additional light upon the problem.

The theory of T. C. Hiestand[8] that there may have been extensive readjustment of fluids as a result of changes in regional and local structures in Kansas and Oklahoma during the several periods of deformation that have affected those areas merit closer scrutiny. However, it does not seem reasonable that this explanation alone would be adequate to account for some of the present occurrences of oil in truncated Ordovician strata.

Certain structures in the Mid-Continent area are known to have possessed some closure in Ordovician strata before the close of Ordovician time. Closed structures were also produced during the post-Hunton, pre-Chattanooga period of diastrophism. Such of these as were not too deeply truncated by erosion as a result of the above-mentioned disturbance or early Pennsylvanian uplifts may well have retained oil and gas, which accumulated in pre-Mississippian time. In fact, this appears to be the most logical explanation of such occurrences. Other productive Ordovician strata in which the Chattanooga or Cherokee formations are in close relation to the reservoirs cannot be explained so easily. Delayed accumulation from Ordovician sources is a possibility, but this theory encounters considerable difficulty considering the number of pools and the large volume of oil involved.

A more critical study of the asphalt deposits of the Arbuckle Mountains, particularly with reference to the derivation of the bitumen, should reveal more evidence regarding the importance of the Ordovician as a source of petroleum in Oklahoma.

Significance of oil residues along unconformities. Much of the definite information submitted in answer to this question merely supplements the data presented above.

In many areas the occurrence of oil residues along erosion surfaces indicates that at least some oil had been generated prior to the close of the erosion interval. It does not necessarily follow that all live oil contained today in the formation below such unconformities is of early origin or that the oil accumulations above such a surface are of later age.

The relationships of the oil residues occurring within the Ordovician along the unconformity at the base of the Pennsylvanian in Kansas and Oklahoma are such as to suggest not only an early origin of oil but also its generation at comparatively shallow depths, unless it is assumed that there has been long-distance migration of hydrocarbons from deep basins, which seems improbable considering the geologic history of the area.

Source of oil and gas in porous rocks of buried ridges. The occurrence of oil in fractured crystalline rocks of buried ridges, as in California, can be satisfactorily explained only by assuming that it migrated from the flanking or overlying sediments. The same explanation applies to oil in most buried ridges of sedimentary rocks, but in a few instances the evidence supports the interpretation that the oils in such occurrences have risen from the formations below the unconformity after long exposure and burial of the reservoirs.

Although the accumulations of oil in buried peaks of Ellenburger (Ordovician) limestone in Cooke County, Texas,

• CONTINUED ON PAGE 46

Effect of Thermal Changes On Natural Brine Densities

By DR. HOMER A. HOSKINS
West Virginia Geological Survey

A KNOWLEDGE of the thermal expansion of natural brines is of value not only for correcting densities to constant temperatures but also for determining their volume behavior under reservoir conditions.

An apparatus was devised, Figure 1, by which the change in volume caused by change in temperature of a definite weight of brine could be measured with a fair degree of accuracy.

This apparatus consists, essentially, of a 50 ml Erlenmeyer flask fitted with a glass stopper in which a pipette of one milliliter capacity has been sealed. The glass stopper was ground to a standard taper in the neck of the flask, and both the stopper and flask were equipped with glass "hooks" so that the stopper could be more firmly held in place by means of rubber bands. The pipette is of the Mohr type, of practically uniform bore, and graduated in tenths and hundredths of a milliliter. Thousandths of an ml can be readily estimated. Several of these assemblies were used to facilitate the tests.

Each apparatus was calibrated to determine its capacity. This was done as follows: the assembly was carefully cleaned, dried and weighed empty. It was then filled fairly full with distilled water and placed in a constant-temperature bath held at 25° C. + 0.01° C. The 0.8 division on the pipette was chosen as a "zero" reading in order that contraction as well as expansion with change of temperature could be noted, so after an hour's immersion the water level was carefully adjusted to that point on the scale by sucking out the surplus water through a capillary tube inserted in the bore of the pipette. If no further contraction or expansion from this "zero" was noted, the apparatus was removed, carefully dried and weighed. The difference between this weight and the weight empty was divided by 0.99707, the weight in grams of 1 milliliter of water at 25° C. The result was the capacity of the apparatus (to the 0.8 ml division) in milliliters. This procedure was carefully repeated and the average of the two determinations was taken as the capacity of the apparatus.

The 0.8 division proved all right for pure water, but the tests showed that the 0.7 or 0.6 division would be required for brines, which contract more at lower temperatures than pure water does.

Several natural brine samples from West Virginia which differed in the determined density by approximately 0.01 gm were selected for the tests. The same procedure was followed, except that for some (the lighter ones) the 0.7 division was used as a "zero" reading. The 0.6 division was used for the remainder for the reason above noted.

After determining the weight of the brine, the apparatus was placed, successively, in constant-temperature baths held respectively at 35° C., 15° C., and 10° C. In each bath the apparatus was left long enough for the expansion or contraction, as the case might be, to become constant. The volumetric change as indicated on the pipette scale was then read and recorded. The apparatus was finally returned to the 25° C. bath for an hour to determine if any loss had taken place through evaporation. Only three brines showed an evaporation loss, so the tests were repeated for these and no evaporation was noted.

The density of each sample was determined for each of the four temperatures used by dividing the determined weight used by the indicated volumes; that is, the original volume plus or minus the milliliters of expansion or contraction indicated on the scale of the pipette. A graph was then plotted with temperatures as ordinates and densities as abscissae. This graph has a separate curve for each brine sample, and the amount of curvature lessens

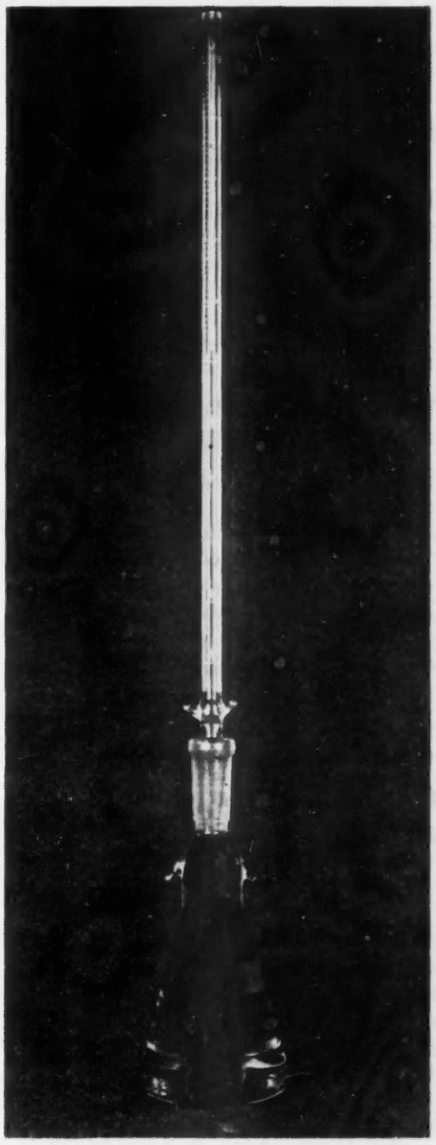

Figure 1. Flask with pipette for determining density characteristics of brines under thermal changes.

TABLE 1

Brine Number	Volume Changes Per ml at 25° C. Decrease 10° C.	Decrease 15° C	Increase 35° C.	Density of Brine At 10° C.	15° C.	25° C.	35° C.
Water	0.00266	0.00206	0.00303	0.9997	0.9991	0.9971	0.9941
545	0.00253	0.00200	0.00300	1.0000	0.9995	0.9975	0.9945
552	0.00284	0.00214	0.00330	1.0134	1.0127	1.0106	1.0073
673	0.00421	0.00300	0.00362	1.0582	1.0570	1.0538	1.0500
519	0.00421	0.00304	0.00363	1.0631	1.0618	1.0586	1.0547
546	0.00447	0.00321	0.00375	1.0765	1.0752	1.0717	1.0677
541	0.00461	0.00339	0.00390	1.0887	1.0873	1.0837	1.0794
534	0.00469	0.00325	0.00379	1.0970	1.0955	1.0919	1.0878
524	0.00495	0.00338	0.00392	1.1122	1.1105	1.1067	1.1024
634	0.00495	0.00341	0.00393	1.1244	1.1228	1.1189	1.1145
521	0.00506	0.00354	0.00405	1.1268	1.1251	1.1211	1.1166
645	0.00528	0.00372	0.00414	1.1375	1.1358	1.1315	1.1269
514	0.00540	0.00379	0.00404	1.1473	1.1454	1.1411	1.1365
806	0.00553	0.00383	0.00425	1.1609	1.1590	1.1545	1.1496
661	0.00565	0.00396	0.00432	1.1765	1.1743	1.1696	1.1644
616	0.00598	0.00409	0.00455	1.1839	1.1837	1.1787	1.1736
839	0.00609	0.00423	0.00436	1.2066	1.2044	1.1993	1.1941
841	0.00593	0.00406	0.00429	1.2117	1.2094	1.2045	1.1994

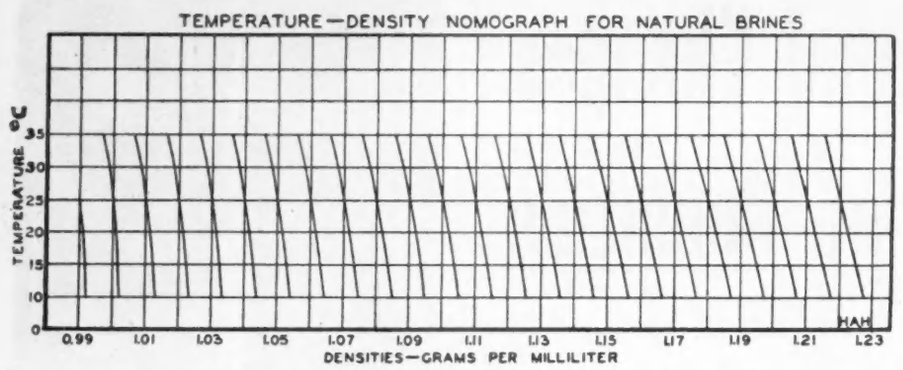

Figure 2. Nomograph for natural brines of varying densities over temperature range covered by experimental series.

from the lighter to the denser brines; in fact, the curve for the heaviest brine was practically a straight line.

A nomograph, based on these curves, was then plotted by drawing lines parallel to the experimental curves through the intersection of each hundredth-unit density line and the 25° temperature line. A brine density, determined at a temperature between 5 and 40° C., can be converted to the density at any temperature between these limits with this nomograph. The point representing the density at the determined temperature is projected parallel to the curved lines to the desired temperature and the density read for that point.

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Oil—Its Origin and Accumulation

• CONTINUED FROM PAGE 44

cannot be cited as definite evidence of the generation of oils in strata above the unconformity, the data point in that direction. So far as the writers are aware, no oil residues have been reported along the unconformity. A comparison of the chemical properties of the oils of the Ellenburger with those in the flanking Pennsylvania sands should be helpful, due allowance being made for possible changes in the Ellenburger oils as a result of their contact with limestone.

The evidence supplied by the relations in the Bilbo pool and by the association of the asphaltic sands of the Comanchean strata to the upturned Glenn formation, both occurrences in southern Oklahoma, is definitely in favor of the interpretation that oil continued to accumulate long after the truncated strata were covered by younger formations. It does not necessarily follow that the oil was being generated as accumulation proceeded. Oil dissseminated for a long period might have become concentrated as a result of changes in circulation of underground waters or other causes. Or, perhaps, oil already accumulated downdip might be released as a result of changes in structure after the old erosion surface was buried.

In any event, it seems certain that oil or source material from which it may be derived can be stored in the rocks for long periods of time before final concentration takes place. It is possible that some of the oils occurring in Ordovician strata below unconformities in Kansas and Oklahoma may be of Ordovician age.

Evidence supplied by faulted relationships. Faulting has not only played an important part in the accumulation of original pools of oil but has also permitted the rearrangement, readjustment, and, in some instances, even the dissipation of primary concentrations of this substance. In many oil traps affected by faults it has not been possible to fix the age of the displacements with reference to the time of accumulation of petroleum. A complicating element is the fact that most faults have experienced repeated movements extending over a considerable period of time, yet this may not always be evident in the structural and stratigraphic relations of the area especially where adequate subsurface information is not available. Thus, it often cannot be determined whether the earlier displacements or the later ones played vital parts in the history of the pools.

In rare instances only one important movement may have occurred along a fault affecting an oil accumulation, and the strata may then have been truncated prior to the resumption of sedimentation in the area. More specific data can then be obtained concerning the time of oil accumulation with reference to the age of the associated beds. The recurrent characteristics of the development of certain salt domes render them particularly interesting in connection with this problem. The evidence of early origin and accumulation of oil in the Raccoon Bend field and of comparatively early accumulation in the Van field, both in Texas, is especially valuable. On the other hand, certain preaccumulation faults which impound oil in California were developed long after the strata affected were deposited and tilted.

Oil and gas in fractured strata. Very little evidence bearing directly on the problem of early versus late origin and accumulation of oil has been elicited.

Obviously, shales and limestones must become consolidated prior to the development of fractures. A substantial amount of compaction of shales must occur before they will yield by fracture. Such occurrences of oil in fissured shales as that at Florence, Colorado, where there is no evidence that oil rose from accumulations in underlying formations, would seem to indicate that oil was not generated entirely contemporaneously with deposition of the shale, else most of it would have been lost during initial compaction. The fracturing of the Pierre shale in this area evidently occurred during the Laramide revolution at the close of Upper Cretaceous time, a considerable period after Pierre sedimentation.

The cavities of some limestones and shales have been partly filled with calcite prior to the entrance of petroleum thus indicating the circulation of water through the openings for some time previous to oil accumulation. Refracturing of the partly sealed formations before oil collected is mentioned by some investigators. Such situations in areas where there is no evidence that oil migrated from younger deposits with a less complex geologic history would lend weight to the theory that the oil of some pools was concentrated substantially later than the deposition of the reservoirs.

Limestones tend to be consolidated relatively early and may undergo early fracturing. But certain fractured-limestone reservoirs were not broken until long after burial (North fields of Mexico) as indicated by the extension of the breaks far up into the overlying formations.

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[7] Clark, Frank R., *Origin and Accumulation of Oil*: Problems of Petroleum Geology, pp. 309-335, Am. Assoc. Petroleum Geologists, 1934.

[8] Hiestand, T. C., *Regional Investigations, Oklahoma and Kansas*: Am. Assoc. Petroleum Geologists Bull., Vol. 19, No. 7, pp. 948-970, July, 1935.

* "The Time of Origin and Accumulation of Petroleum" a report of research conducted under the sponsorship of the American Association of Petroleum Geologists, was published in full as Volume 36, No. 2, of the Quarterly of the Colorado School of Mines and may be obtained from the Department of Publications, Colorado School of Mines, Golden, Colo.

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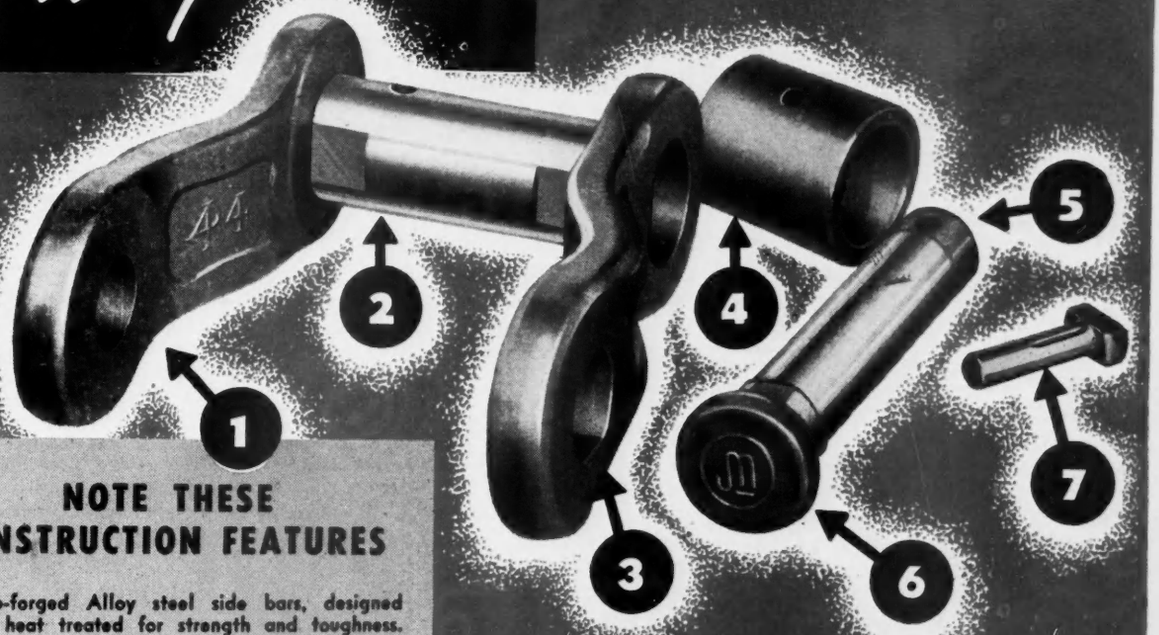

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Recommendations on U. S. National Oil Policy

Part I

THE question of a U. S. national oil policy affects the American domestic operator and the American oil operator abroad, alike. It affects the stockholders, the officers, and every other employe.

What happens in oil in the U. S. A. affects operations abroad. What happens abroad affects the purely domestic operator.

That is why we are presenting herewith the final report of the U. S. Senate committee (O'Mahoney Committee). If you are in the oil business you ought to read it. The footnote comments are our own.

FOLLOWING one of the most thorough investigations ever undertaken by a U. S. Senate committee, the recommendations of the O'Mahoney Committee on a national oil policy were made public some time ago.

Briefly, they involve no radical departures from the thinking of American oil men. They recognize the advancements of the petroleum industry under a competitive system of private enterprise, and urge retention of this system as the best way of providing an adequate oil supply for the nation. Because of this and other examples of sound reasoning, the committee's report is noteworthy.

Thus far no legislation has been offered to convert the suggestions into an active policy.

Because of the interest of the industry as a whole in the matter, WORLD OIL, beginning with this issue, reproduces the entire report, first giving the recommendations, then following with the full text of the report, minus the footnotes which occurred in the text as adopted by the committee.

Recommendations on Policy

In setting forth its recommendations, at the conclusion of the report, the committee said that while the nation is united in striving for world peace and international understanding, it must not abandon to chance its industrial and military capacity to uphold its ideals. Accordingly, it faces two alternatives: either 1) to hope for discovery of domestic oil reserves fully adequate for military requirements and to depend meanwhile on foreign oil and trust that war will not cut off imports, or 2) to guarantee adequate domestic supply by promoting discoveries of new reserves and by encouraging manufacture of synthetic liquid fuels to supplement domestic crude supply.

"All the facts before us impel the choice of the second alternative," stated the committee in its concluding recommendations for a national petroleum policy. "Therefore, the first principle of American petroleum policy should be to sustain our domestic supply of petroleum and to maintain the American system of competitive free enterprise at home and abroad. The second principle is to make human freedom the cornerstone of our policy, liberty and opportunity for people without discrimination or restraint, both within and beyond our borders.

"To these ends we should:

"1. Enact those laws which are most conducive to stimulating additional exploration and development in the United States. Encourage conservation to prevent waste. Promote interstate compacts so that our reserves may be expanded and used in the public interest, but guard against any danger of misusing conservation laws to restrain unduly any operator. Administer the public lands, not primarily as a source of governmental revenue, but for the purpose of stimulating private initiative in discovering and developing oil on the public domain.

"2. Utilize the facilities of government to promote research in the manufacture of synthetic liquid fuels, but without permitting governmental competition with private industry. Enact such legislation as may be necessary and proper to encourage secondary recovery from old fields which otherwise would not be productive.

"3. Encourage free competitive enterprise by tax reforms to provide incentives for the risk of private capital in new ventures. Maintain the atmosphere in which competition may survive by enforcement of the antitrust laws. Adhere to the federal statute prohibiting interstate shipments of petroleum produced in violation of state law. Continue the provisions of the income tax law permitting deductions for depletion and intangible drilling costs.

"4. Require full disclosure to the appropriate agency of government of the principal terms, conditions, and obligations by which American companies undertake to carry on the petroleum industry abroad.

"5. Follow a foreign policy designed to promote full development of the petroleum resources of the whole world for the benefit of all peoples of the world; to secure adequate supplies of petroleum to all peoples; and to discourage artificial restraints and restrictions, both political and private, which deny full opportunity for the people of all lands to participate beneficially in the production and distribution of petroleum and petroleum products."

The committee was headed by Joseph C. O'Mahoney, Wyoming, chairman, and included Tom Connally, Texas; Arthur H. Vandenberg, Michigan; Edwin C. Johnson, Colorado; E. H. Moore, Oklahoma; John H. Overton, Louisiana; Owen Brewster, Maine; Chan Gurney, South Dakota; Scott W. Lucas, Illinois; Burnet R. Maybank, South Carolina; Robert M. LaFollette, Jr., Wisconsin. The study on which the accompanying final report was based was officially designated as an "Investigation of Petroleum Resources in Relation to the National Welfare." The report, in full, follows:

Introduction

Until science succeeds in harnessing atomic energy to the everyday machines of the modern world, petroleum will continue to be the most essential fuel of industry both in peace and in war. The discovery, development, and utilization of petroleum in modern times was one of the principal factors which prior to World War II had made the United States the greatest industrial nation. It is also indisputable that during this war the intensive production of United States petroleum, at a rate in excess of that indicated by scientific principles for maximum efficient recovery, was one of the chief factors of military victory. Therefore, it is not too much to say that the evolution of modern industrial civilization and its preservation from Nazi totalitarianism may be attributed in very

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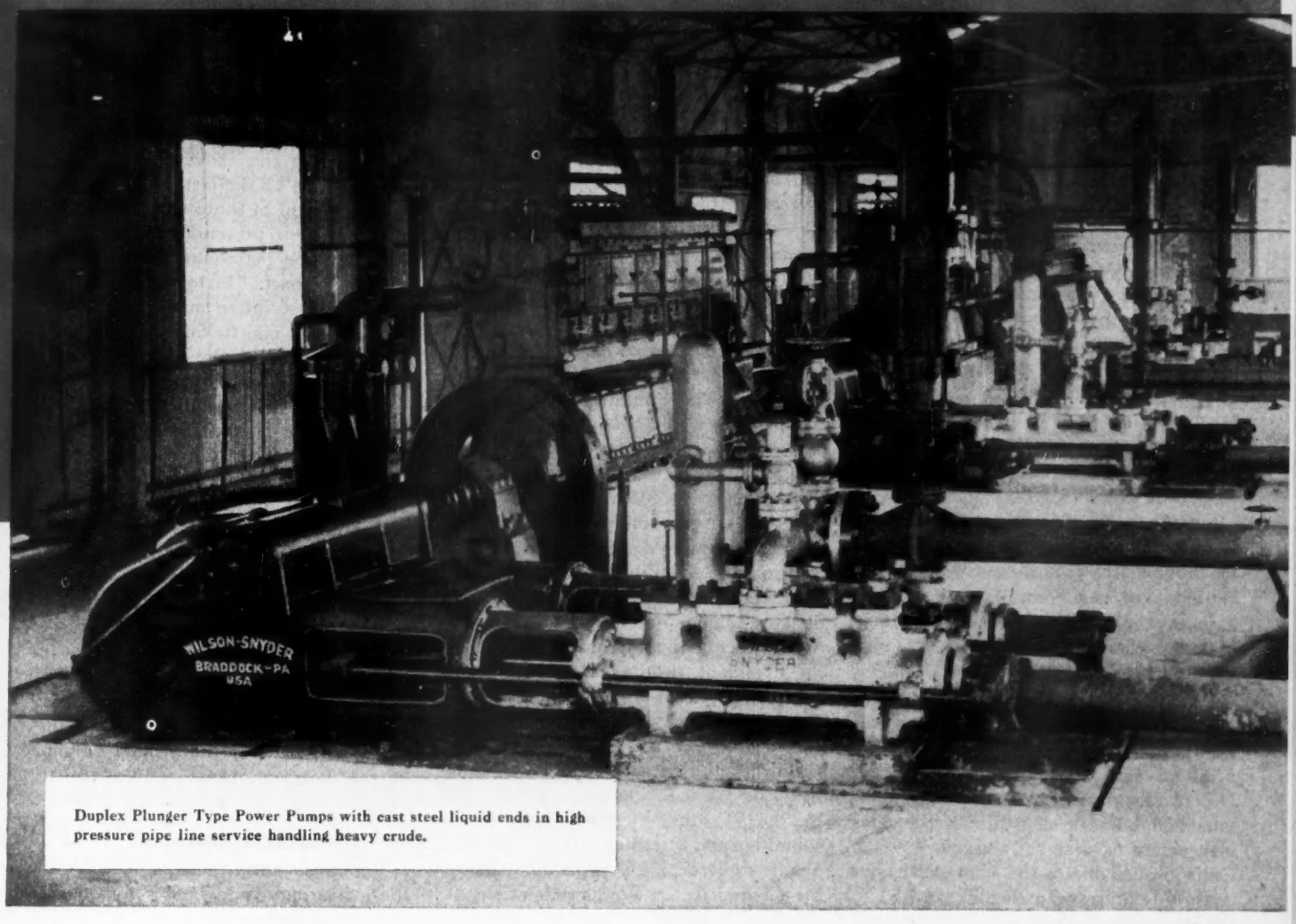

Duplex Plunger Type Power Pumps with cast steel liquid ends in high pressure pipe line service handling heavy crude.

BECAUSE of their remote locations, foreign users of pipe line equipment are often the most careful buyers. One of these users sent in the following description of his Wilson-Snyder main-line pumps: "The design was such that the unit or knocked down weight of each machine was kept at a minimum for transportation, though each assembled unit resulted in each case in a rugged pump, amply strong to withstand the maximum pressure produced. This element of strength was so accurately calculated that the pumps, which have been in constant service for 12 years, have never had a broken part, nor have the lines been shut down once through failure of equipment."

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large measure to petroleum, to the American oil industry, and to the teamwork between the industry and the government. *But more than that, it is now clear that no nation which lacks a sure supply of liquid fuel can hope to maintain a position of leadership among the peoples of the world. It follows that if the United States is to hold the place it now occupies on the world stage as an effective leader in elevating the standard of living for people, it must develop a national petroleum policy which will make certain that we shall not become dependent upon any other country for our supply of liquid fuel.*

This basic fact was recognized by the United States Senate when on March 13, 1944, in creating this special committee of eleven senators, it declared that "adequate petroleum reserves are essential to our national security and economic welfare." The committee was instructed "to make a full and complete study and investigation with respect to petroleum resources, and the production and consumption of petroleum and petroleum products, both within and outside the United States, in their relation to our national welfare and security," and to "report to the Senate at the earliest practicable date the results of such study and investigation, together with its recommendations for the formulation of a national petroleum policy."

On April 6, 1945, the Intermediate Report of the committee was submitted to the Senate, recording the principal activities of the committee up to the date of the death of Senator Francis Maloney, the former chairman, on January 16, 1945.

Prior to the date of the Intermediate Report the attention of the committee was largely directed a) to the wartime proposal that the government of the United States construct, own, and maintain a pipe-line system across the Arabian peninsula designed to make Persian Gulf oil available to the United Nations in the Mediterranean theater, and b) to the question whether the Anglo-American oil agreement should be an executive agreement or a treaty subject to approval by the Senate under the treaty-making power of the constitution.

Obviously the project to build and own a trans-Arabian petroleum pipe line, if carried out, would have taken the people of the United States through their government into the active development abroad of the natural resources of foreign countries, thus effecting a revolutionary change in national policy. It would have made the government an owner in an area over which it had no political jurisdiction, thus breaking down, beyond the geographical frontier of the United States, the line of demarcation between the industrial and economic function of the people as individual private citizens, and the political function of the government as the agent of all the people. Suffice it to say that the executive hearings held by this committee, under the wise and extremely capable leadership of the late Senator Francis Maloney, and the advice given by him, as spokesman for the committee, to President Roosevelt resulted in the abandonment of the project.

Pact Submitted as Treaty

As to the constitutional status of the Anglo-American oil agreement, the committee succeeded in having it submitted to the Senate as a treaty, despite the fact that it was originally designed by its authors to take effect between the United States and the United Kingdom merely as an executive agreement. In view of the far-reaching implications and the important subject-matter of the agreement, the committee believed that there was no question but that it constituted a treaty and ought to be handled as such according to the constitution. The committee had observed with alarm the increasing inroads made upon the treaty-making power in recent years through the device of the executive agreement. The committee therefore decided that it would be contrary to public policy and to constitutional limitations if this important international covenant were permitted to escape the scrutiny of the Senate. Again, the executive hearings by this committee (on which sat the chairman of the Committee on Foreign Relations) and the conferences between Senator Maloney and the highest executive officers of the government, including the President, resulted in the agreement being transmitted on August 24, 1944, to the Senate as a treaty. Subsequently, on January 10, 1945, President Roosevelt withdrew the treaty for renegotiation with the United Kingdom. On November 1, 1945, the revised treaty was resubmitted by President Truman to the Senate, where it is now pending before the Committee on Foreign Relations.

Upon completing the activities referred to in the Intermediate Report aforesaid, the committee next addressed its attention to the underlying problem of the formulation of a national petroleum policy. In order that there would be made available to the Congress and to the public a complete exposition of the basic facts involved, without which no competent judgment could be rendered, the committee conducted public hearings in Washington, D. C., as follows:

1. "Foreign Contracts Act." (S. 11.) Joint hearing with a subcommittee of the Committee on the Judiciary. (May 17, 18, 21, and 22, 1945.)

2. "New Sources of Petroleum in the United States." (June 19, 20, 21, 22, and 25, 1945.)

3. "American Petroleum Interests in Foreign Countries." (June 27 and 28, 1945.)

4. "Petroleum Requirements — Postwar." (October 3 and 4, 1945.)

5. "War Emergency Pipe-line Systems and Other Petroleum Facilities." Joint hearing with surplus property subcommittee of the Committee on Military Affairs. (November 15, 16, and 17, 1945.)

6 "Wartime Petroleum Policy under the Petroleum Administration for War." (November 28, 29, and 30, 1945.)

7. "The Independent Petroleum Company." (March 19, 20, 21, 22, 27, and 28, 1946.)

8. "The Oil and Gas Division of the Department of the Interior." (June 17, 1946.)

At each of the above hearings, with the exception of the last, the committee had the benefit of thorough factual presentations by representative groups selected by the petroleum industry. The statistics, charts, historical data, and elaborate descriptive material, thus assembled with painstaking care, together with their logical presentation at the hearings, have been of great aid to the committee in arriving at its conclusions. Likewise, the committee has benefited from the valuable testimony of numerous witnesses from governmental agencies charged with duties relating to certain phases of petroleum activity, and from interested members of the public—to all of whom the committee expresses its gratitude. Indeed, too much credit cannot be given to the representatives of industry and of government for the thoroughness and the frankness with which they prepared and presented their evidence. The demand which the committee has had for the printed volumes of the hearings bears witness to the value of the material that was gathered.

Factual Summary

The most pertinent facts developed at these hearings may be briefly summarized as follows:

1. Although the demand in the United States for petroleum and petroleum products is greater now than it ever has been, and although the demand gives every indication of continuing to increase, this country is no longer the world's greatest reservoir of oil. More than 63 percent of all petroleum produced in the world between 1859 and 1941 was drawn from deposits within the boundaries of the continental United States. It was United States oil that made this country the industrial leader of the world. It was United States oil primarily that fueled the armies, the fleets, and the air squadrons of the United Nations in the war against Germany, Italy, and Japan. Today, however, less than one-third of the proved

oil reserves of the world are located in continental United States.

2. Discoveries of new fields in the United States during the past ten years have been decreasing in size and importance, while the opposite is true of discoveries made abroad. The average new field discovered at the present day in the United States scarcely exceeds 2,000,000 barrels of recoverable oil, while the 300 fields discovered abroad during the 20 years prior to 1943 have an average ultimate yield of about 100,000,000 barrels each.

3. In the United States one wildcat well has been drilled for every 12 square miles of prospective area, but in foreign countries only one wildcat has been drilled for every 480 square miles; and the best evidence available at the moment would indicate that the land area of Russia is a greater potential source of petroleum than continental United States.[1]

4. New sources of petroleum in the United States might be obtained (but to what extent no one can say with any degree of certainty) in the following ways:

a) New exploratory drilling on the public domain and elsewhere; b) Deeper drilling, as a result of improved technology, to horizons hitherto untested; c) Stimulated production from old fields by improved methods of secondary recovery and by payment of governmental subsidies;[2] d) Exploration of the continental shelf;[3] e) Manufacture of gasoline and other products from natural gas; and f) Extraction of petroleum from oil shale, and manufacture of synthetic liquid fuel from coal as well as from agricultural commodities.

5. The discovery, production, refining, and distribution of petroleum and its products are operations too complex and costly to be feasible for individual enterprise, but may be conducted efficiently and profitably only by corporate organizations.

6. American groups, organized in the corporate form, have not only achieved a high degree of efficiency in the United States but have carried the industry to almost every quarter of the globe.

7. The development of the industry has been marked by the appearance of integration and concentration.

8. During the year 1944, 83.51 percent of all crude oil run to stills in the United States was handled by 21 major companies. The remaining 16.49 percent was refined by approximately 234 independent companies. In the same year, 61.3 percent of the gross domestic production of crude oil was produced by 21 major companies.[4] In the case of American oil companies with investments abroad, from 93 to 95 percent of the total investment is held by 22 companies and their subsidiaries and affiliates.

9. American oil interests own or have a share of production or of proved crude-oil reserves in 20 foreign countries in both hemispheres. American petroleum investment abroad increased at the rate of $100 million per annum during the 20-year period beginning with 1920. The American share of foreign proved reserves (excluding Russia) has grown from 22.7 percent of the estimated 9175 million barrels in 1928, to 46.3 percent of the estimated 37,554 million barrels in 1945. The American share of foreign proved reserves in the Western Hemisphere is 65.2 percent of the total foreign reserves in this hemisphere.

10. The risks and financial costs involved in foreign operations are of such magnitude that only the larger companies can assume the hazards, and even these companies find the difficulties so great that they customarily operate through hundreds of subsidiaries and by means of joint ventures among themselves and with foreign corporations so as to distribute the risk.[5]

11. American oil companies, managed independently of the government of the United States, are associated in some joint ventures with foreign oil companies that are controlled by foreign governments.

12. Foreign concessions in which these investments are made involve operations of such magnitude, often affecting vast areas and large segments of native populations in the stage of agricultural or nomadic civilization, that the companies must engage in activities which are normally considered the function of government, charity, or industries of other types.

13. The very size of many foreign concessions, covering areas sometimes greater than most states of the American Union, and affecting the economic welfare of all inhabitants of the regions where located, necessitates complicated negotiations between the companies and the foreign governments concerned. The resulting contracts have, therefore, an intimate relationship both with the economy and the politics of foreign countries.

14. The economic impact of the production and distribution of petroleum upon the people of all nations of the world is so great that not infrequently a strong movement develops toward nationalization of petroleum resources in those countries where oil deposits are found, and toward establishment of state oil-trade monopolies in other countries that are on an import basis.

15. There are vast areas of the globe which apparently are without petroleum deposits. Most of Africa and Australia offer little prospect to the driller. China, Japan, eastern Siberia, a large part of Russia in Europe, the Scandinavian peninsula, France, Spain, Italy, and the British Isles are virtually without local sources of oil supply. Except for the United States, which with approximately 20 percent of the world's potential oil-producing area has furnished more than 63 percent of the world's oil requirements, the more industrialized and populous countries must look beyond their own borders for the petroleum they require. Russia, however, which cherishes among its dominant aspirations the achievement of industrial leadership, possesses in the Ob basin of western Siberia a vast extent of potentially rich oil land, and also has control of important sources of supply in the Caucasus and in eastern European territory.

16. American oil companies operating abroad have furnished a large proportion of Europe's needs from their Latin-American concessions, and are now preparing to furnish an even larger proportion from their concessions and through their distributing facilities in the Near and Middle East.

The mere recitation of the above facts makes it immediately obvious that the story of oil now unfolding on the international horizon is a political and economic drama of the first magnitude. It is a drama of peace and war and progress that may affect the future of civilization.

The formulation of a national oil policy raises questions both domestic and international—questions as to production and consumption at home and abroad; questions of the relationship between the "independents" and the "majors," among the majors themselves, and between the majors and foreign governments; questions of cartelization and imperialism; questions of the relationship between American operators and the government of the United States; and finally, questions of international understanding among the peoples of the world, so that petroleum, instead of being a possible source of conflicting ambitions among rival powers, may become a means of raising the standard of living of people everywhere and of promoting the dissemination throughout the world of the principles of human liberty.

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[1] A quick glance at the map published on pages 16 and 17 in the 1947 *World Oil Atlas*, provided each subscriber of THE OIL WEEKLY (now WORLD OIL) visualizes the truth of this statement.—Editor.

[2] Senator E. H. Moore of Oklahoma, a member of the Senate Committee, in an addendum to the report, questioned seriously the policy of subsidies.—Editor.

[3] See *The Oil Weekly* of January 6, 1947, page 17, for comprehensive article on possibilities of continental shelf.—Editor.

[4] Later in the report the statement is made that two-thirds of all domestic wildcat wells are drilled by "independents." The report could have said also that 72 percent of all wells in the United States are drilled by "independents."—Editor.

[5] It is possible for a combination of "independents" to operate in areas outside the USA, although, such practice has not been followed for many years.—Editor.

BUSINESS ACTIVITY AND FOREIGN AFFAIRS AT *Critical Point*

By L J LOGAN

THE next several months are expected to bring highly important developments, economically and politically, nationally and internationally. For the petroleum industry, changing situations and special problems may be involved.

On the one hand, there are signs that the domestic economy already is at a crucial point in the postwar reconversion. Prices, production, employment, and business activity appear to be hanging precariously on a lofty and unstable plateau from which they will have to drop in order to get back on solid ground. Such drops after previous wars have been sharp and rough.

A full-fledged, unmistakable decline is expected by some forecasters to become evident possibly by August and not later than September or October. Some of them say a new break in the stock market will herald or accompany a business activity decline.

Some analysts emphasize the close similarity and timing of statistical curves following World Wars I and II. The curves for 1918, 1919, and 1920 have been practically duplicated in numerous cases by those for 1945, 1946, and 1947. If this similarity continues, the lows of 1920 and 1921 will have for comparison corresponding lows to be reached in the latter half of 1947 and the first half of 1948.

Highs Reached?

There are numerous signs that highs following World War II already have been reached, and the present strength of oil industry markets does not necessarily raise doubt that the peak has been reached. After World War I, commodity prices in general began to decline almost a year before crude prices broke. Lumber prices, excessively high then as now, began to slide in April, 1920, kept declining for 17 months, and went down 60 percent before stabilizing in August of 1921. Crude prices, in contrast, did not make their final rise until March 1, 1920, when lumber prices were wavering, and that peak price for oils held until a reduction January 24, 1921, after which there were additional cuts at frequent intervals until bottom was reached at the middle of June, 1921. Oklahoma-Kansas grade dropped altogether from $3.50 a barrel to $1, though it recovered several months later to $1.25 and by the end of 1921 to $2.

Following World War II, commodity prices in the aggregate reached a peak in March, 1947, and subsequently falteringly have declined, and lumber prices were at a new high in April, 1947, but by the end of that month were widely reported as weakening. Crude prices, however, were increased at the middle of March, 1947, and in late June, 1947, there was a further increase in California, while another increase for the rest of the country appeared to be a distinct possibility. From all this, it is a good guess that if petroleum prices are not already at their postwar peak, they will be when and if a new general increase occurs.

Carrying the analogies further, any weakening of petroleum prices would not be indicated until the spring of 1948 at the earliest. Incidentally, this checks with forecasts that difficulties of meeting demand for petroleum should begin to clear up within 12 to 18 months, through expansion of facilities. A business letdown might make the earlier of those limits more likely.

The closely similar trends after the two wars are not mere coincidences. They reflect the same results of the same causes. So the recession of 1920-21 may be a worthwhile cue to a business readjustment to be expected in 1947-1948.

However, trends and charts and curves alone cannot be depended upon to lay the future out like an open book. They have to be read and interpreted in the light of conditions and events. In the present situation, developments will continue similar to those after World War I only insofar as fundamental conditions are repeated. And herein lies the hazard of projecting curves further along the pattern of the early 1920s. For it now is indicated that this postwar period may develop into something quite different from that of the '20s.

The great difference, and a difference only recently fully realized, is that peace is much less secure this time than after World War I. Resumption of peace-time pursuits then encountered no serious interruption, but this time it quite possibly may. Conflicting objectives and policies of Russia and the U. S. are expected to precipitate important further counter actions and programs within a few months. U. S. moves on the international scene are expected to involve serious dislocations and difficulties in the domestic economy.

On undertaking aid to Greece and Turkey, the U. S. entered upon a foreign policy that now is broadened to involve aid to other non-communist countries and particularly to Western Europe. It is contemplated that the U. S. will supply those nations with goods for reconstruction; that their economic recovery can be started with U. S. government funds, then carried on through their own efforts and production, with aid of the World Bank, private U. S. capital, and commercial credit extended by U. S. industrial firms.

That is the new and now firmly established foreign policy of the U. S. It is a policy that may be expected to command strong support. For its ultimate objective is national defense, by way of strengthening democracy and forestalling communism. A secondary but closely related objective of the policy is the encouragement and stimulation of international trade, in the interest of world prosperity and peace and resultant security for the nation. Because of these broad and vital objectives, the policy is expected to be fully effectuated.

Cost High

But its cost in dollars and goods will be great. Figures on the likely cost are of the order of $5 to $10 billion a year for several years. That is not a pleasant prospect for the taxpayers already heavily burdened with present federal government expenditures of more than $30 billion per year. Likewise, the prospect of dipping deep into U. S. supplies of materials and goods is not pleasant for a nation still suffering shortages after years of denial of needs.

Increased foreign drain on U. S. production is believed certain to cause new scarcities, maladjustments, and necessity of special economic measures. The program may involve, for example, private if not governmental allocations of supplies of some materials and goods, and voluntary if not governmental controls and regula-

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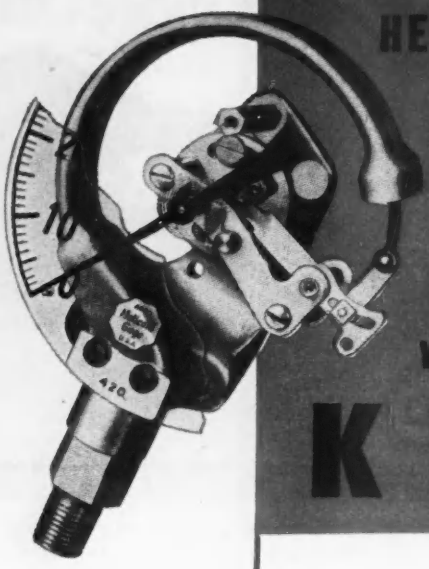

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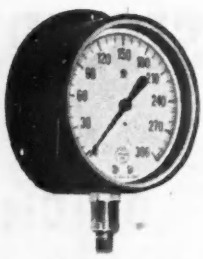

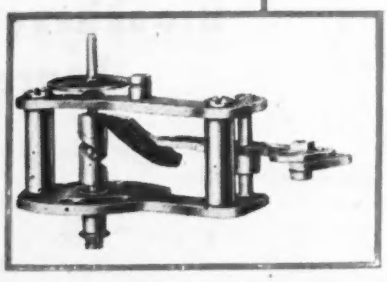

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tions for some industries. Especially affected, it may be assumed, will be the heavy goods, durable goods, industries—steel, machinery, automotive, electric manufacturing. Although products of these industries are badly needed in the U. S. itself, they are the first requirements also for foreign reconstruction and recovery. Coal also will be required for export, and so will petroleum products, for transportation, construction, and fueling new plants. Just as oil was vitally needed in the military operations of the war, it will be extensively required in the projected reconstruction operations. On the one hand, the American petroleum industry may find difficulty in getting steel products and other materials accentuated, while on the other the demand for its own products may be intensified.

In view of the bold moves of Russia in Europe and the fast developing new crises there, predictions are being made that full U. S. prosecution of this program lies no more than a few months ahead, with Congress likely to deal with it in a special fall session if not in an emergency extension of the present session.

Business as a whole may not be as far along the road toward normal peacetime operation as the statistics indicate, and it may be substantially more than the estimated 12 to 18 months before the petroleum industry can achieve its needed expansion and fully meet the potential demand for its products.

Tide Water Plans Wildcats

William F. Humphrey, president of Tide Water Associated Oil Company, in a recent visit to the Rocky Mountains announced an expansion of activities for his company in the region. Tide Water now plans two wildcats in Wyoming this year and is carrying on an extensive exploratory campaign in each of the Rocky Mountain states. Several lease blocks have been acquired recently by the company in Wyoming, Colorado and Utah and the company now has geological and geophysical crews detailing the blocks.

Socony Grants Made

Philip D. Caesar, Paulsboro, N. J., and William C. Skinner, Dallas, are the recipients of the first educational grants made by Socony-Vacuum Oil Company. Socony-Vacuum established educational grants to enable outstanding technical employes in its laboratories to study for advanced degrees. Candidates were required to have a bachelor's degree and to have been employed by the company at least two years.

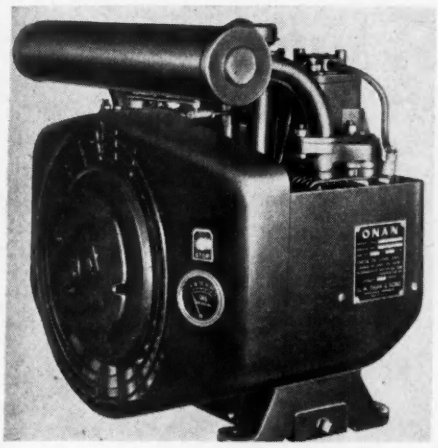
Under the grants, the recipients will receive full pay for the length of time necessary to earn degrees of doctor of philosophy at accredited schools of their choice beginning with the fall term. It is anticipated that an additional award of this character will be made each year henceforth.

NEW EQUIPMENT LITERATURE

FOR ADDITIONAL INFORMATION, USE MAILING CARD INSERTED OPPOSITE THIS PAGE

1—Gasoline Engine

The new Onan CK engine is a ten horsepower, 4-cycle, air-cooled, prime mover weighing only 97 pounds. Lightness in weight is attributed to its aluminum construction, which the manufacturers claim also aids in the dissipation of heat. Each of the two cylinders has more than 340 square inches of cooling surface. The engine has a three-inch bore, 2¾-inch stroke and 38.8 cubic inch displacement. The opposed cylinder construction simplifies the distribution of cooling air as well as results in smooth running balance.



An improved ignition system has been developed for this engine which consists of a low voltage pulse-generator that supplies current to a hermetically sealed, high-voltage ignition coil mounted on top of the engine for easy servicing.

D. W. Onan & Sons, Inc., 43 Royalston Ave., Minneapolis.

(Check item 1 on postcard for more information.)

2—Surface Coating

Development of a new surface coating provides economical protection for roofs and other structural surfaces exposed to extreme summer temperatures. The new coating, brushed or sprayed on a surface in the form of a dark brown liquid, immediately turns to a silver color, as aluminum particles held in suspension in the coating's asphaltic base, rise to the surface. The result is a continuous cohesive metallic film on the surface, which reflects heat, insuring cooler building interiors. Its appearance is the glossy luster of aluminum.

Tested under extreme conditions of heat for several years, this coating has remained unchanged by weather that has ruined many roofing materials within a period of months. Laboratory tests reveal that infrared heat rays, which cause some roofing materials to froth and smoke in a few minutes time, show no effect on materials given a surface finish of this aluminum-asphalt coating.

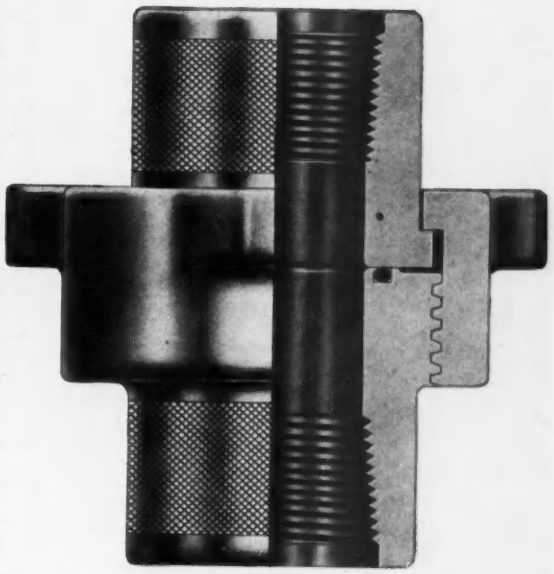
Standard Oil Company of California, 225 Bush St., San Francisco.

(Check item 2 on postcard for more information.)

3—Wing Union

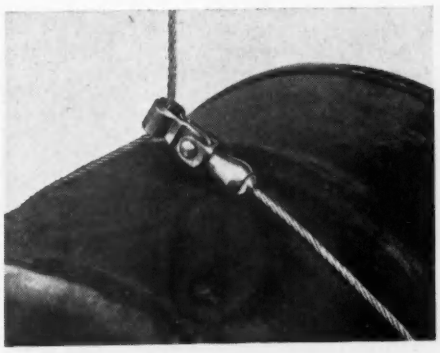
The L & L "Flat Face" wing union effects a seal by a synthetic, oil-resistant "O" ring in the union, and does not depend upon seating and compressing metal surfaces by hammer blows. It is said to seal against recommended pressures with the nut made up hand tight. In actual use it is necessary only to tighten the nut sufficiently to prevent it from backing off. The "O" rings are securely held in position beneath a shoulder in the groove, and will seal against recommended pressures even if mating surfaces of the union become damaged, the manufacturer states.

Maintenance costs of the new unions are reported to be low since the "O" rings are easily replaced at low cost when necessary. They are made in standard sizes from two-inch up through four-inch, with test pressures ranging from 1000 to 10,000 pounds per square inch, and working pressure from 500 to 5000 psi respectively.



Yale Machine Works, 4403 Yale St., Houston.

(Check item 3 on postcard for more information.)



4—Choker Sling Fitting

A choker sling fitting of new design employs two overlapping and coacting hooks which are easily applied to a wire rope to form a loop of any desired size.

Another feature is that the hooks are joined to the dead end portion of the choker sling fitting by a pivot which allows the unit to conform automatically to the size of the load. No matter what the diameter of the load, within capacity limits, the pivoted hooks allow the fitting and cable to maintain a straight line, when under load, preventing sharp bends of the cable where it enters the fitting, thus prolonging the life of the cable.

The new choker sling fitting, besides having a dead end connector of the familiar Electroline Fiege type, can be furnished with a simple locking device which prevents the rope from slipping through the hooks and holds the rope firmly in loop of any desired size.

Electroline Company, 4121 South LaSalle St., Chicago 9.

(Check item 4 on postcard for more information.)

5—Tubing Swabs

Bell tubing swabs are made in two and 2½-inch sizes, and consist of standard two-cup and four-cup assemblies provided with flexible adapters which permit the swab to pass through curved pipe in any depth well. The Bell swab cup is reversible and can be used in either position, thereby giving it double service life. When the reversible cup is assembled on the swab mandrel, the lower half of the cup is restricted by the lower sleeve of the mandrel in such a manner that the lower half of the cup will not come in contact with the tubing, thus eliminating wear on the lower cup section.

The upper half of the swab cup is free of the mandrel, which allows it to restrict itself when falling into the well, and upon reaching the desired depth to pick up a full load. A large opening through the center of the mandrel section and a large slotted bypass allow the swab to fall into the hole at high velocities.

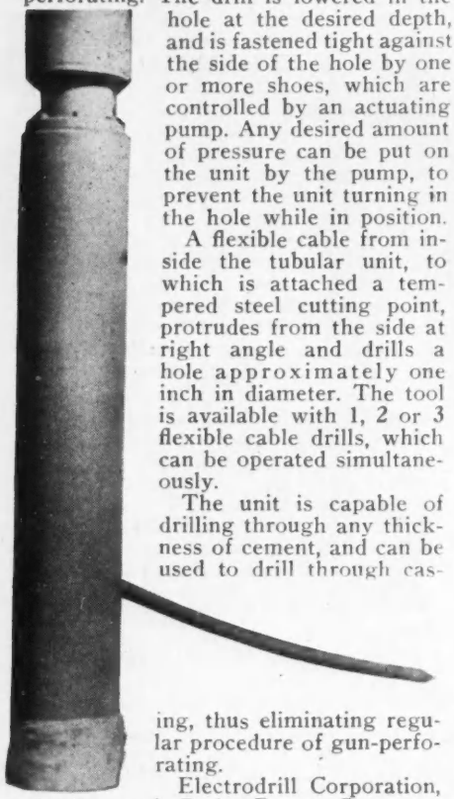
Top part of the cage can be furnished with API flange-type ball seats as well as screw-type.

Mechanical Manufacturing Company, P. O. Box 1001, Fort Worth, Texas.

(Check item 5 on postcard for more information.)

6—Sidedrill

A sidedrill has been designed which can be used for horizontal drilling or perforating. The drill is lowered in the hole at the desired depth, and is fastened tight against the side of the hole by one or more shoes, which are controlled by an actuating pump. Any desired amount of pressure can be put on the unit by the pump, to prevent the unit turning in the hole while in position.



A flexible cable from inside the tubular unit, to which is attached a tempered steel cutting point, protrudes from the side at right angle and drills a hole approximately one inch in diameter. The tool is available with 1, 2 or 3 flexible cable drills, which can be operated simultaneously.

The unit is capable of drilling through any thickness of cement, and can be used to drill through casing, thus eliminating regular procedure of gun-perforating.

Electrodrill Corporation, subsidiary of Reda Pump Company, Bartlesville, Okla.

(Check item 6 on postcard for more information.)

7—Drilling Recorder

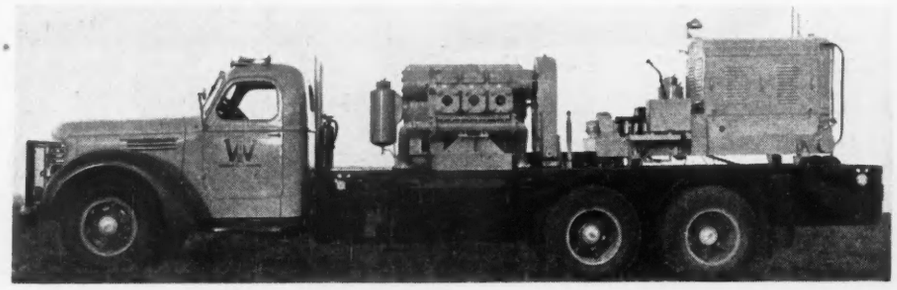
The "Log-O-Graf" provides an entirely automatic and continuous record of the rate of penetration of the drilling bit in the formation. The strip-type chart is graduated in inches and tenths of an inch to conform to an electrical log. No replotting is necessary, since all changes in lithology in the form of a curve are recorded as drilled. This information, which is indicative of the degree of porosity and permeability of formations, is immediately available for correlation. The geologist has subsurface control of the well while actual drilling is in progress.

According to the manufacturer, the instrument is easy to install and operate. It is mounted on the derrick floor where it can be constantly observed by the driller. The method employed makes use of a small steel line which is attached to the swivel and is threaded over a sheave just below the crown block, then to the driving sheave of the instrument, then to a sheave below the thribble board where it is connected to a dolly which rides up and down a guy wire of the derrick.

The "Log-O-Graf" is available on a rental basis in domestic fields and may be purchased outright for export.

Warren Automatic Tool Company, Houston.

(Check item 7 on postcard for more information.)

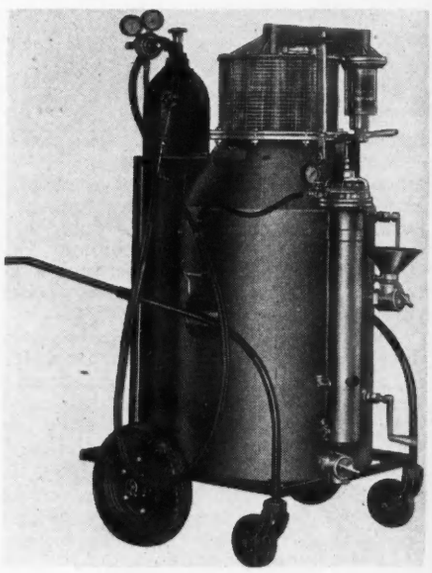


8—High-Pressure Acidizing Unit

To meet special operating conditions in West Texas, a new 4½ x 8-inch high pressure, high volume twin engine acidizing unit has been designed primarily to operate in conjunction with tank trucks. The unit is capable of developing up to 5000 pounds per square inch pressure. Truck and auxiliary motors are synchronized and sufficient power is available to pump four barrels a minute at 2000 pounds per square inch. A feature of the unit is that pump and prime mover are built around a flat-bed design with tool boxes hanging from the bed and the mounted equipment fastened to the top of the flat bed so as to make for ease in maintenance in the field.

Design Engineering Company, Midco Building, Tulsa.

(Check item 8 on postcard for more information.)



9—Acetylene Generator

Model AP Sight Feed portable acetylene generators are the result of three years of engineering work and field trials, and has been tested by Underwriters Laboratories. These generators use 1/4 x 1/12 carbide which is said to give excellent acetylene yield and is generally available everywhere.

A special feature is the sight feed hopper which makes visible the supply of carbide to prevent completely exhausting the hopper before refilling. The hopper rests on top of the water tank and is of screen enclosed Pyrex. The carbide is fed through a feed valve which is controlled by a pulsator assembly.

The 25-AP unit holds 25 pounds of carbide and 25 gallons of water. It is rated at 50 cubic feet of acetylene per hour, and is capable of delivering approximately 125 cubic feet per charge of carbide. The 50-AP unit holds 50 pounds of carbide and 50 gallons of water providing it with an output of 250 cubic feet of acetylene per charge, or 100 cubic feet per hour. One charge is said to be equal to one large acetylene cylinder. The largest model, 100-AP has a capacity of 100 pounds carbide per charge and 100 gallons of water. Rated capacity is 200 cubic feet per hour, and it is capable of delivering 500 cubic feet of acetylene per charge.

The Sight Feed Generator Company, Richmond, Ind.

(Check item 9 on postcard for more information.)

10—Prospecting Unit

The electrical prospecting technique developed by Gish and Rooney of the Carnegie Institute of Washington more than 20 years ago has been used extensively. The apparatus illustrated is the latest development embodying this technique, and is the culmination of more than 13 years of research and development on this subject.

The equipment shown embodies the necessary measuring instruments, including a precision potentiometer for measuring the potential difference in the earth set up by the flow of current from cur-

Molybdenum steel sucker rods help reduce one of the biggest pumping maintenance costs.

MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

Climax Molybdenum Company
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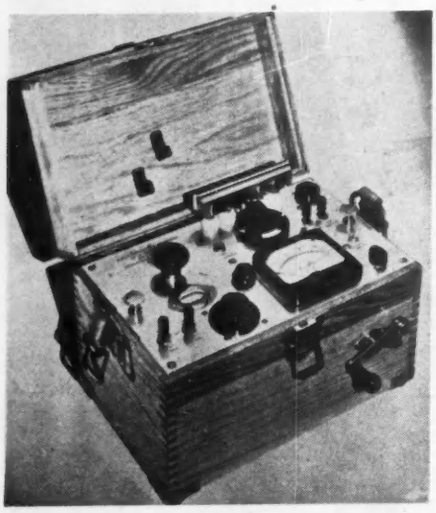
MOLY

rent electrodes. A motor-driven, precisely constructed commutator is mounted below the panel of the unit with the necessary filters and shields to avoid disturbance to measurements



by the action of the motor and commutator. Care is used throughout the construction of the instrument to avoid spurious effects. Use of the "guard-ring" principle as enunciated by Gish and Rooney and of thorough shielding both eliminate such spurious effects. The new features in construction of the apparatus include improved wiring arrangements facilitating servicing, gold-plated connection terminals, a simplified switching arrangement, fungusproofing, etc.

The measuring apparatus is furnished separately or in a complete outfit including the following: Battery power supply (employing standard radio "B" batteries), metal ground stakes, light-weight aluminum alloy cable reels, light-weight high strength field cable, connecting leads, and instructions for use.

Geophysical Instrument Company, 1820 N. Nash St., Arlington, Va.

(Check item 10 on postcard for more information.)

11—Feed-Water Controller

A new method of sensitively controlling feed-water for boilers, embodying powerful and positive magnetic action, is known as the Micro-Netic electric controller. Weighing only 7½ pounds, it can be attached to a boiler to occupy a space of 3½ x 7½ inches for its housing and with a switch box measuring 2 x 4 x 6½ inches.

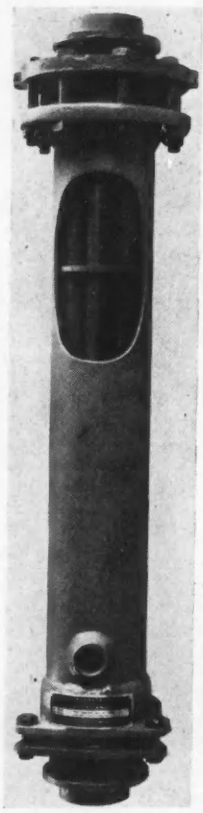
The Micro-Netic embodies a round ball float of monel, capable of resisting a pressure of 400 pounds per square inch. This float carries a steel ring which attracts the magnets when the ring comes into their fields. Alnico permanent magnets are used, capable of lifting 100 times their own weight. A Micro-switch is used.

When the level of water in the boiler lowers to a predetermined point, the magnetic action opens the water line, and when the level rises to a certain point, the feed line closes automatically.

J. A. Campbell Company, 645 East Wardlow Road, Long Beach 7, Calif.

(Check item 11 on postcard for more information.)

12—Heat Exchanger



Seven-Tube "Karbate" impervious graphite shell and tube heat exchangers for highly corrosive conditions are available in three standard sizes. All three units employ 1-inch inside diameter x 1½-inch outside diameter "Karbate" tubes in bundles encased in standard 6-inch I.D. steel pipe shells. The exchangers are identical in every respect except for pipe length and the number of "Karbate" baffles, and all tube bundles and shells of the same size are interchangeable.

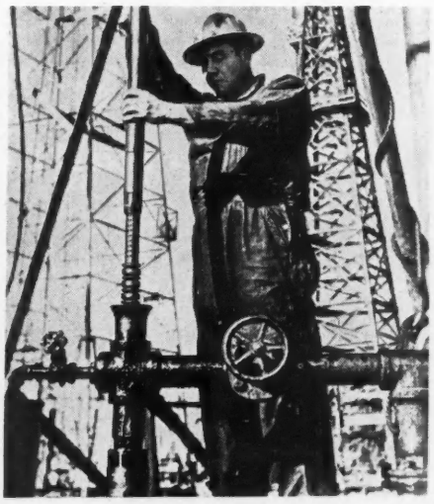
The units can be employed as heaters, coolers, boilers or condensers, and can be operated vertically or horizontally. They will carry temperatures up to 338° F. (170° C.) and a working pressure of 50 pounds per square inch on both the tube and shell sides. Standard nozzle connections permit ready installation with piping connections of almost any material of construction. Water, brine or steam are suitable on the shell side.

National Carbon Company, Inc., 30 East 42nd St., New York 17.

(Check item 12 on postcard for more information.)

13—Well Treater

A new application of an old principle, the McRay Treater controls electrolysis, is said to remove scale and prevent its formation on subsurface equipment of oil wells. Run in the well on the end of the rods or in a tube on the bottom of the tubing string, this treater sets up an electromotive force in the fluid, which renders the salts and minerals inert, at the same time it removes the scale, and stops corrosion and electrolysis. According to the manufacturer, the McRay Treater requires a minimum of attention



after installation. In repeated tests over the past three years, this device has proved efficient in preventing scale formation on new rods, pump tubes and equipment and in removing scale formations from old equipment.

McRay Sales Company, 1156 East Colorado Street, Pasadena 1, Calif.

(Check item 13 on postcard for more information.)

Literature

14—Dresser Booklet

A volume containing 112 pages tells who the Dresser Industries, Inc., are, what they make and how they operate. Location of member companies are listed on a two-page spread map of the U. S. More than 100 pages are used to picture some of the products of the member companies. Brief descriptions and specifications accompany the illustrations, which cover not only oil field equipment manufacturers but industrial appliance manufacturers also.

Dresser Industries, Inc., Terminal Tower, Cleveland 13.

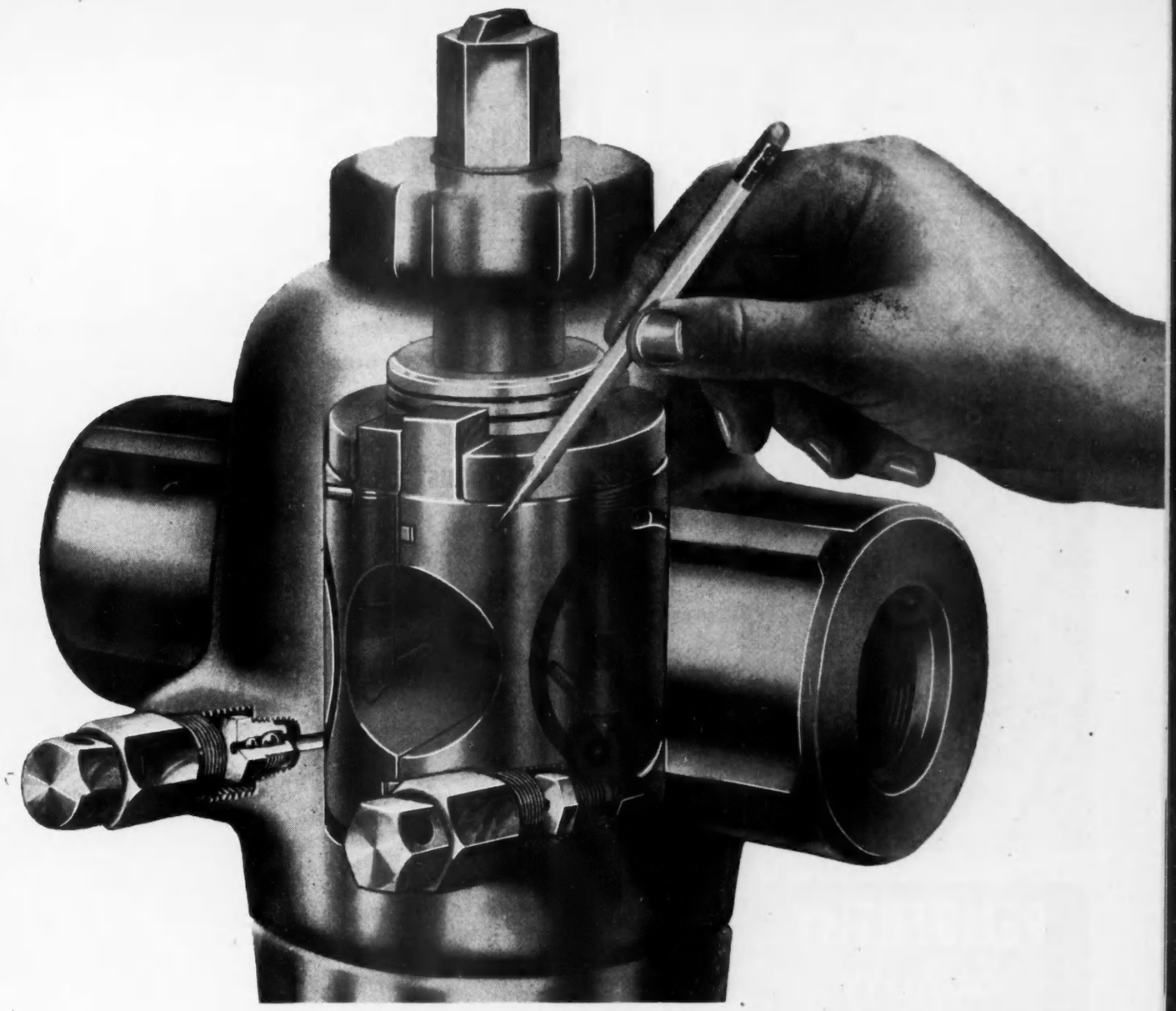
(Check item 14 on postcard for more information.)

15—Rotary Swivels

Bulletin No. 334, describing the Ideal type "F" swivel for drilling oil wells to moderate depths, is illustrated with eight explosion photographs, a dimensional blueprint and a chart showing the main bearing capacity. The eight-page, two-color publication contains descriptions of each feature of the type "F" swivel. Each part is individually illustrated in its relation to other parts. Detail photographs and sectional drawings clearly illustrate construction of the wash pipe and packing box assembly. Specifications and illustrations of accessory equipment are also listed.

The National Supply Company, P. O. Box 899, Toledo 1.

(Check item 15 on postcard for more information.)



This Cylindrical Core CAN'T WEDGE!

The MISSION Plug Valve has no equivalent on the market today, because of 3 unique advantages. One of these advantages, pictured above, is its split cylindrical core, the two halves held apart by spring pressure. Another is that this core is Super-Surfaced* by a special process which gives it an extra-hard, extra-smooth finish, greatly reducing friction. The third advantage is that the MISSION is the only *automatically* lubricated plug valve. Line pressure feeds lubricant *continuously* to the bearing surfaces from reservoirs in the core.

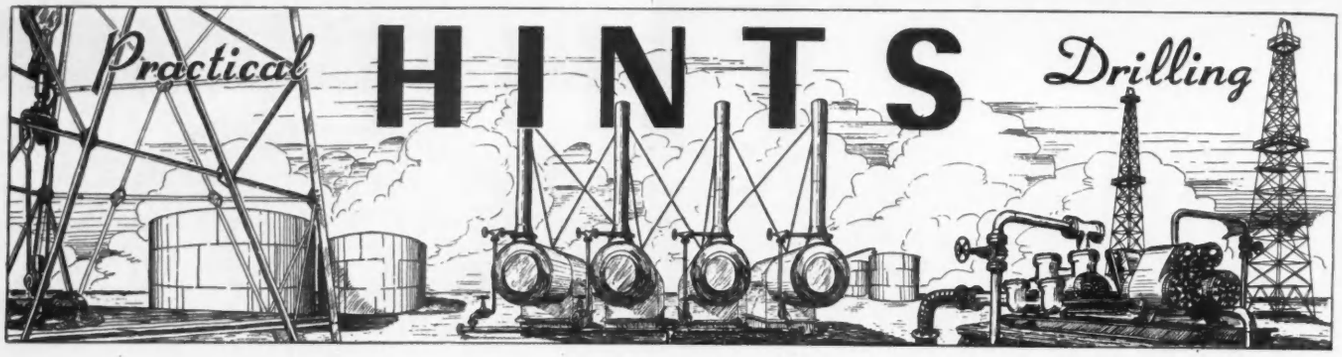
These features mean that the valve *cannot wedge* . . . is *always* easy turning. Demand for this perfected valve is growing by leaps and bounds.

Mission Manufacturing Co. Houston 14, Texas
Export Office: 30 Rockefeller Plaza, New York 20, N. Y.

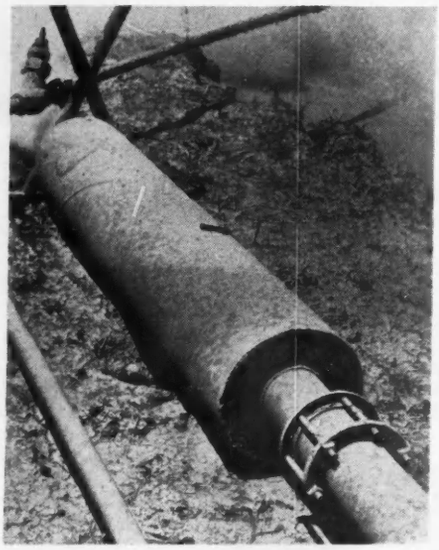
*Trade-Mark Registered U. S. Patent Office

Mission Automatic Lubricated **PLUG VALVES**

. . . have a *mission* . . . to save you money!



$10.00 is paid for each illustrated acceptable contribution. Mail to The Editor, WORLD OIL, P. O. Box 2608, Houston 1, Texas



How To—
Reduce Steam Exhaust Noises

STEAM LINES

In areas where ample water is available and it is not necessary to condense engine exhaust steam for re-use in the boilers, the general practice is to discharge engine exhaust steam into the atmosphere. Unless long runs of this exhaust line are employed to place the discharge more than 100 feet from the rig floor, considerable pulsation noise results. Not only does the constant vibration become annoying at times, but it also interferes with communication between the crew members.

On a relatively short exhaust line, one company reduced much of the pulsation noises from the drilling engine steam exhaust in a unique manner. A muffler made from a section of 9-5/8-inch casing approximately five feet long was connected to the end of the four-inch exhaust line by a sleeve-type coupling. The annulus between the 9-5/8-inch casing and the four-inch pipe, welded at both ends of the enlarged section, was closed by welding a flange piece of sheet steel to the casing and to the exhaust line. The exhausting steam passes through a short four-inch nipple on the discharge side of the muffler.

Principle of operation lies in the increased volume provided by the enlarged section in the 9-5/8-inch casing. As the drilling engine exhausts steam into this enlarged section in pulsations, the muffler tends to smooth out these pulsations to reduce the exhaust noise. Fabrication of the unit makes it an easy job of uncoupling the muffler when the rig is moved.

PENBERTHY
QUALITY PRODUCTS

Penberthy injectors—ejectors—automatic electric and water (or steam) operated sump pumps are all widely used throughout the oil industry because they have always been dependable under the most severe service conditions.
All are of rugged construction and made by an organization with 59 years experience in the manufacture of highest quality products.

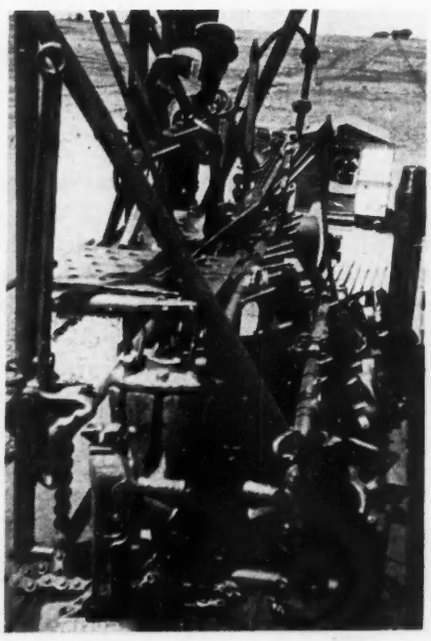
PENBERTHY PRODUCTS
PENBERTHY INJECTOR CO.
DETROIT 2, MICH. Canadian Plant WINDSOR, ONTARIO

How To—
Build Handy Tool Rack

TOOL STORAGE

About as many different ideas for handling rig floor tools may be found on rotary drilling rigs as there are drilling rigs. However, the following tool rack is presented because of the efficiency which it has provided in the work on the rig floor. It is relatively simple in construction but provides storage for a wide range of tools. Here may be found anything from standby slips to crow bars, all arranged for ready selection.

The rack is made by welding two-inch pipe to form a frame work each end being a triangle. To these ends are welded cross members which not only brace the rack but also form hangers from which small tools or parts of tools may be hung. The horizontal braces are pegged with solid steel rod material such as concrete reinforcing rod or salvaged sucker rod. Midway up the rack are two perforated steel plates. These plates are holders for end wrenches, hammers, or tools which cannot be hung from the metal pegs.



IT TAKES THE DON'TS OUT OF ROTARY HOSE HANDLING

The new Goodall "FLEXO" Rotary Hose is so flexible and durable that it gives sensational service with only normal care.

For years, all rotary hose manufacturers, including us, have had to send out hose accompanied by a long list of don'ts that **had** to be followed if users wanted to get even reasonably good service.

That was because even normal flexure would break the reenforcing wires that the hose depended on for strength.

Now here is a new type of hose that does not depend on tightly wrapped wires for strength. It has a new construction that is not weakened by bending.

The result is a hose that lasts so much longer it obsoletes all others.

Safely Withstands Normal Handling

It is so flexible it is shipped in a 63-inch crate. It safely withstands bending that would immediately ruin ordinary hose.

It is the strongest hose built, and it features the Barney Coupling—the only coupling stronger than the hose.

No Increase in Price

You can get Goodall "FLEXO" at standard prices, and it is backed by Goodall—originators of high pressure hose and long known as a leading manufacturer of rotary hose. Make your next rotary hose Goodall. You can order it with complete confidence that you will get longer service than you have ever known.

GOODALL
FLEXO
LONG LIFE Rotary Hose

BARNEY COUPLINGS — the only couplings stronger than the hose — are standard on **Goodall Flexo Rotary Hose.**

Stocked at all distribution points

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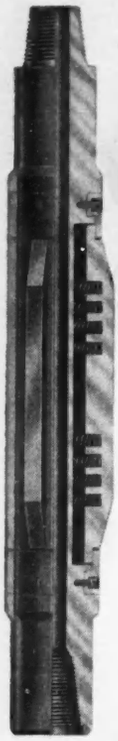
FACTORY AT TRENTON, NEW JERSEY.



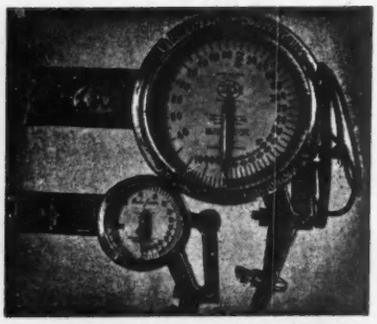
Give tomorrow's work-over crew a break

. . . Leave the inside of the casing "clean as a hound's tooth" by running a BAKER CASING SCRAPER just above the bit when you drill out cement, or clean out after a perforating job. No tricks, no trouble.

BAKER *Rotary* CASING SCRAPER

ASK THE *BAKER* MAN

LINE SCALES



20 MODELS to choose from

(Above) Super 500,000# capacity, 14" dial. (Below) Packer Special, Capacity 40,000#, 6" dial. 18 other models for every drilling, well servicing or work-over need.

With a Line Scale you know the pull on the line, and the weight on the bit in pounds. Accurate, sensitive, rugged and economical.

Line Scales are dependable, even in areas of rapid temperature changes. Repeated tests prove the accuracy of Line Scale readings under all working conditions.

LINE SCALE CO., Inc.
Phone 2-1765, 907-11 SE 29th St., Box 4245
Oklahoma City, Oklahoma

How To—

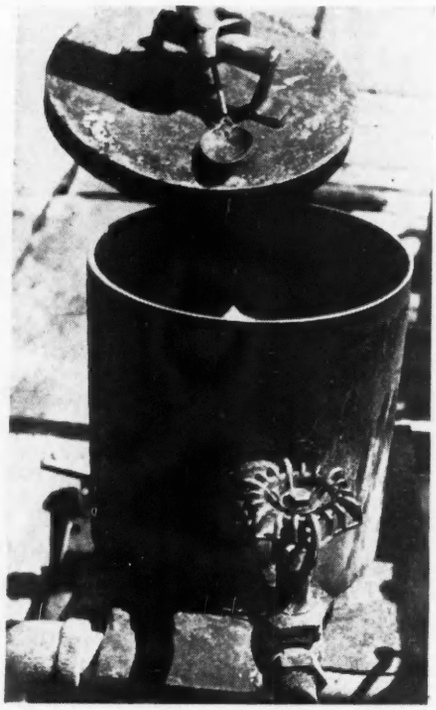
Build Handy Steam Boiler

Hot meals on drilling rigs in remote areas are the exception. However, the crews on one steam rig are able to have hot meals three times a day. When tapped to a source of steam, the device illustrated becomes an excellent broiler.

CREW COMFORT

The home-made broiler is a 20-inch nipple of 16-inch casing which has been sealed at the bottom by a section of plate steel. A second seal is made six-inches from the top of the casing to form a compartment in the bottom. A one-inch connection is welded about midway up the casing nipple to provide an inlet for the steam into this chamber. A valve on this line controls the flow of steam through the boiler. On the opposite side, but placed at the base of the casing is a one-inch exhaust line, which carries away the steam plus and condensate which may form due to the drop in temperature.

The cover was made of ¼-inch plate steel with a one-inch lip welded around the circumference. A heavy wooden handle completes the unit. A few minutes before meal time, food is placed in the broiler and the steam valve opened. In short order, the contents are hot.



How To—

Control Draft on Boilers

Where the duck's nest of boilers is not fully enclosed with fire brick (which also forms a foundation for the rear part of the boilers), wind endangers the fire under the boilers. In one installation where the fire box was supported by long pipe runners and the fire box open at the bottom, adequate control of the flame was made possible in the boilers by the installation of rectangular sheets of plate steel. Use of these plates also aided in the draft control.

BOILER SETTING

Size of the plates depend on the height the boilers are set above ground level. In the boiler shown, the plate measured 14 inches by five feet. Two such plates are placed on edge next to the boiler on either side of the exposed fire box. The application of these plates on all boilers prevented the surface winds from interfering with the burner flame and have performed this job satisfactorily since their installation. Their use eliminates the necessity of constructing elaborate duck's nest with fire brick.

How To—

Construct Blow Barrel

Drilling crews working on steam rigs have several advantages not enjoyed by men on power rigs. One of these is the familiar blow barrel found on almost all steam rigs, whether afloat or ashore.

CREW COMFORT

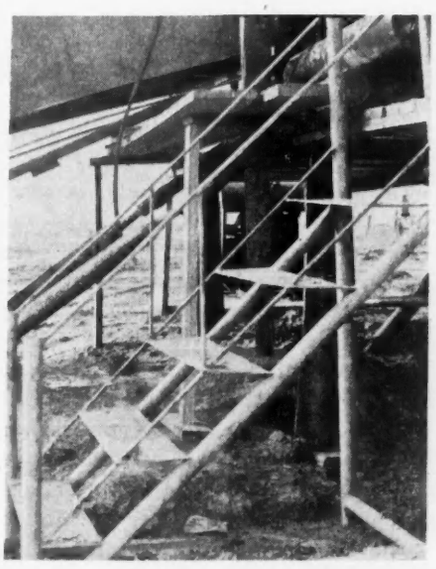
The use of steam in boiling water for cleaning clothes at the conclusion of each tour saves many dollars.

A durable blow barrel which has rendered much service in cleaning greasy, muddy work clothes can be constructed of 20-inch casing as shown. Approximately four feet in length, the section of casing is belled at the bottom and sealed by welding a metal plate over the opening. Just above this seal, two holes are cut through opposite sides of the casing to receive a 30-inch nipple of 1-inch pipe. The pipe is welded in place and fitted with a union on one end and a valve on the other. The section of 1-inch pipe passing through the blow barrel is perforated on the top side to allow steam to shoot up into the water, causing it to boil.

A valve on the inlet side of the one-inch line controls the operation of the barrel, while the valve on the discharge line permits the dirty water to be drained. A second drain is provided (in the foreground) to remove dirt and other particles from the bottom of the barrel. Water is piped to the barrel through the line shown at right. A section of one-inch pipe may be used to stir the clothes while boiling. A two-inch hole was cut about six inches from the top of the casing to act as an overflow.

How To—

Fabricate Stairway



STAIRWAYS

A substantial stairway leading from the ground to the derrick floor can easily be fabricated from junk pipe, salvaged sucker rod material and a few pieces of discarded tank steel. In the example shown, the runners and upright supports are of two-inch pipe, welded to suit the height of the derrick floor. The tank steel is cut to form the foot plates of the stairway and welded at such an angle to place them in a horizontal position when the unit is set up at the rig.

Parallel to the runners are the step braces and handrails, the latter being welded across the upper ends of the upright supports. Each corner of the steps is tacked to the sucker rod to provide a rigid stairway.

Fabrication of such a unit is simple, requiring salvaged material to make a sturdy unit which can be used over and over, and can be set up at each location in short order.

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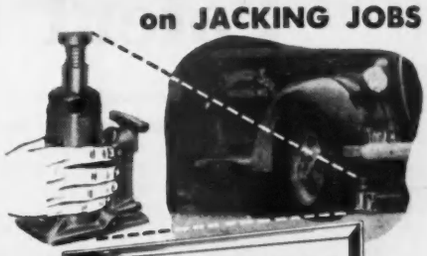

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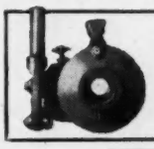

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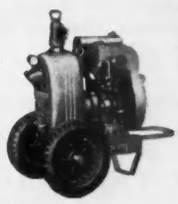

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Patent Roundup

In this column are reviewed patents dealing with drilling, producing and pipe line branches of the oil industry that are issued by the United States Patent Office

PATENTS recently issued by the United States Patent Office, Washington, D. C., include those listed below.

Printed copies of the patents listed are furnished by the Patent Office for 25 cents per copy and can be had by addressing the Commissioner of Patents, Washington 25, D. C.

Oil Well Pump

This pump for deep wells and its technique for protecting the pump plunger of tubing pumps while lowering or raising in the well (No. 2,366,807) has been patented by Luther B. Rowsey, Houston, and has not been assigned.

A plunger provided with a traveling valve is lowered through the tubing to the pump barrel, which is part of the tubing string. The plunger has cups or other sealing means to form a seal with the walls of the barrel so that upward strokes of the plunger and valve are effective for lifting the oil. The shield has a normally expanded end portion which is adapted to receive the plunger to be protected, but which contracts during travel within the tubing. It is of relatively thin material, with an inwardly extending flange at its upper end to prevent slipping of the plunger assembly. The lower end of the shield is slotted and the middle segments are tensioned and thickened at their lower ends and tapered inwardly so that a relatively sharp edge is formed, which removes paraffin or other material along the walls of the well. When the shield containing the assembly is lowered to the upper end of the barrel the segments move outwardly and the shield is arrested, leaving the plunger assembly free to move from the shield into the barrel for pumping operations. It is designed to prevent scratching of the plunger cups or packing, and damage usually inflicted on the sealing means during upward trips in the well by pressure of the weight of a column of oil.

Geophysical Prospecting

Raymond Maillet, Paris, France, has obtained this patent (No. 2,420,672). It is vested in the U. S. attorney general.

The apparatus consists of, in combination, means for setting off a charge of explosive, seismographs for detecting elastic waves in the ground, amplifiers, including a thermionic tube with a variable grid polarization, and a means placed in operation by the detonating means for automatically varying polarization in a gradual manner as a function of time, in such a way as to vary both the range of frequencies adapted to pass through the amplifiers and the sensitiveness of the apparatus.

Flange Jack

This patent (No. 2,420,438), is held by Marshall M. Morgan, Tyler, Texas, and is unassigned.

The jack separates flanges connecting pipe. It consists of a wedge adapted to enter the joint between the flanges, a plate having end slots, a jack screw threading through the plate and having a swiveling connection with the wedge, hooks having inwardly turned ends adapted to enter the bolt holes in the flanges while the other ends extend through the slots, cross rods on the plate to support the hooks, and a means for rotating the jack screw.

Winch Cable Anchor

This device (No. 2,420,594), has been patented by Mark Manley Hall, Prescott, Ariz., who has assigned one-third to Delmar F. Reeves of Phoenix.

The anchoring means comprises a cylindrical cable clamping pin of substantially uniform diameter slidably fitting an opening in one of the flanges at either end of the drum on which a cable is wound and projecting from the inner and outer faces of the flange. The pin is of a diameter considerably greater than the cable to be clamped and has an opening diametrically through near the inner end adapted to receive the end of the cable, the opening being elongated axially of the pin, the outer projecting end of which is threaded and engaged with a nut. When tightened this engages the outer face of the flange, drawing the cable against the flange and clamping it between the inner face of the flange and the inner end of the opening through the pin.

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Crude Production Declines Slightly; Runs to Stills Far Above Last Year

The industry continued operations at high levels during the week ended July 5, with favorable effect on production and stocks of the principal refined products, The API's latest report indicated.

Domestic crude production decreased 44,000 barrels a day from the previous week's output to average 5,065,000 barrels daily, which was 160,000 barrels a day more than was produced in the comparable week a year ago.

Crude runs to stills averaged 5,109,000 barrels a day during the week of July 5, to show an increase of 16,000 barrels a day over the previous week's runs and 235,000 a day over runs of last year's like period.

Stocks of refinable crude totaled 236,021,000 barrels June 28, an increase of 561,000 barrels in the week ended that date and 12,338,000 barrels or 5.5 percent more than was on hand a year before. Not included in this latest stocks figure were 5,445,000 barrels of non-gasoline bearing crude in California.

Production of gasoline, including natural blended at refineries, amounted to 15,759,000 barrels in the week, a drop of 311,000 barrels from the preceding period, but 1,222,000 barrels more than the output in the like week a year before.

Stocks of finished and unfinished gasoline totaled 89,674,000 barrels after being lowered 2,132,000 barrels during the seven-day period, and were 1,953,000 barrels or 2.1 percent lower than the 91,627,000 barrels that were on hand a year earlier.

Production of the distillate fuel oils was stepped up by 53,000 barrels to amount to 5,659,000 barrels during the week ended July 5. That amount was 107,000 barrels or 1.9 percent more than was produced in the comparable period of last year. Additions totaling 1,279,000 barrels were made to stocks of these oils, boosting them to 43,000,000 barrels by the week's end. That amount was 2,834,000 barrels or 7.1 percent more than was in storage a year before.

Output of the residual fuels increased 187,000 barrels over the previous week to total 8,485,000 barrels. Compared with last year's comparable week, that was an increase of 330,000 barrels or 4 percent. Stocks of these heavy fuel oils were upped 661,000 barrels to a new total of 49,151,000 barrels, which was 1,676,000 barrels or 3.5 percent greater than the amount held a year ago.

California-Initiated Crude Hike Moves Into East Texas

Increased crude prices, initiated earlier in the month in California and Pennsylvania fields, spread in the East Texas field last week, and rumors of premiums being paid for Gulf Coast crudes continued.

Premier Oil Refining Company announced that effective July 10, it would boost its posting for crude purchased in East Texas field 10 cents a barrel. This increase brings the price to $2.05 a barrel.

Sylvester Dayson, Premier president, said the hike was made to "meet competition of certain purchasers who are paying premiums above the current posted prices for crude oil in East Texas."

Late in the week there had been no reports of other purchasers of this crude meeting the boost.

Rumors have prevailed on the Gulf Coast for several weeks that postings for coastal crudes would be increased. However, no action has been taken. Also prevalent in this area are reports that purchasers are paying premiums for certain types of crude produced in a number of coastal fields. Reports say the premiums are paid principally by firms or individuals engaged in the exportation of oil. This export market is reported to be very active and buyers are bidding higher prices in anticipation of possible crude raises.

Humble Oil & Refining Company advanced its tank wagon gasoline prices ½ cent a gallon in Texas east of the Pecos river. Humble's move completed the list of major marketers to follow the initial advance made last week. Gulf Refining Company initiated the ½ cent raise at mid-point of last week and by the week's end was joined by others.

Standard Oil Company (Ohio) announced an increase of 1 cent per gallon in its statewide service station price for gasoline effective July 9. Statewide price to dealers was advanced .75 cent per gallon.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gasoil and Distillate Stocks Barrels	Gasoil and Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
High:												
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1- 8
1945	4,944	7-21	5,140	8-18	227,554	10-13	99,012	3-24	45,341	11-17	56,074	1- 6
1946	4,961	6-15	4,968	12-28	229,430	3- 2	105,233	2-16	[1]67,286	11- 9	61,036	11- 2
1947	[1]5,115	6-21	[1]5,164	6-14	239,370	5-31	107,576	3-29	58,034	1- 4	53,285	1- 4
Lows:												
1945	3,621	10- 6	3,409	10- 6	[2]211,813	8-25	70,791	10-13	26,483	3-17	38,548	5-26
1946	4,403	3- 9	4,498	1-12	218,193	1- 5	85,324	9-28	25,131	3- 9	37,289	4- 6
1947	4,531	4-11	4,667	4-12	220,313	2- 8	89,674	7- 5	31,470	4-19	42,668	4-26

TRENDS OF 1946 AND 1947

Trends in Week Ended	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gasoil and Distillate Production Weekly	Gasoil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1946									
January 5	4,548	4,651	218,193	14,488	98,494	5,923	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	•39,290
March 30	4,425	4,684	224,994	13,896	104,715	5,337	28,240	8,738	37,746
April 27	4,672	4,685	224,443	14,228	99,631	5,568	30,466	9,204	39,404
May 25	4,759	4,857	222,214	14,312	95,769	5,463	32,973	8,908	43,368
June 29	4,957	4,854	223,883	14,500	92,333	5,325	37,762	8,828	46,477
July 27	4,926	4,896	223,756	14,535	88,626	5,817	44,316	8,217	49,517
August 31	4,833	4,911	227,132	15,014	87,217	5,630	53,134	8,539	53,173
September 28	4,778	4,829	223,043	14,675	85,324	5,632	59,827	8,172	57,657
October 26	4,730	4,758	221,184	14,863	86,423	5,710	65,499	7,728	60,872
November 30	4,795	4,707	227,693	15,145	88,371	5,258	66,062	7,672	58,647
December 28	4,713	4,968	225,995	15,604	93,126	5,931	58,941	8,181	53,427
1947:									
January 4	4,649	4,917	223,291	15,281	94,882	5,857	58,034	8,375	53,285
January 25	4,672	4,820	221,655	14,624	99,801	5,630	50,357	8,224	48,558
February 22	4,786	4,860	224,580	14,668	103,904	5,929	40,739	8,542	44,919
March 29	4,865	4,843	227,529	14,396	107,576	5,969	32,737	8,668	43,364
April 26	4,930	4,726	235,383	14,213	103,860	5,435	32,286	8,186	42,668
May 31	5,024	5,000	239,370	14,709	95,876	5,732	36,032	8,910	45,224
June 7	5,064	5,148	234,849	15,350	94,802	5,286	37,173	9,032	46,779
June 14	5,113	[1]5,164	234,902	15,695	93,356	5,981	38,285	8,960	47,812
June 21	[1]5,115	5,078	235,660	15,682	91,877	5,942	40,835	8,598	48,766
June 28	5,109	5,093	236,221	16,070	91,806	5,606	41,721	8,298	48,490
July 5, 1947	**5,065**	**5,109**	.....	**15,759**	**89,674**	**5,659**	**43,000**	**8,485**	**49,151**
July 6, 1946	4,905	4,874	[3]223,883	14,537	91,627	5,552	40,166	8,155	47,475
Change:									
In Week	—44	+16	+561	—311	—2,132	+53	+1,279	+187	+661
In Year	+160	+235	+12,338	+1,222	—1,953	+107	+2,834	+330	+1,676
In Year	+3.3%	+4.8%	+5.5%	+8.4%	—2.1%	+1.9%	+7.1%	+4.0%	+3.5%

[1] All time peak. [2] Lowest since December, 1921. [3] Stocks, June 29, 1946.

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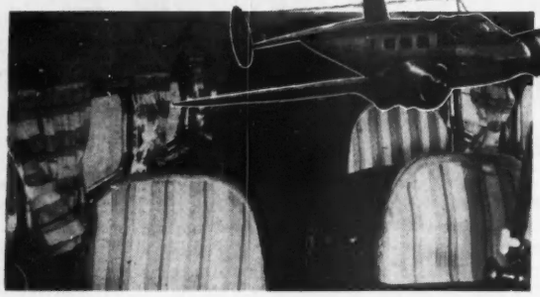

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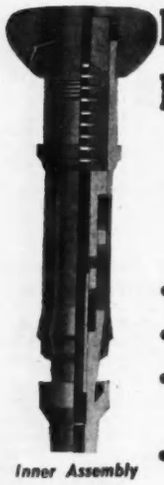

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SOLD IN EXPORT

• Oklahoma

Southwest Antioch Pool Gets Extension from Two Wells

Two wells extend Southwest Antioch pool to northwest; oiler extends production of Northeast Elmore pool to west; Harper County wildcat gets oil and gas shows on test; Texas Company well flows 100 barrels per hour; plugged-back well produces 700 barrels daily at Little River pool; Sunray extends Grief Creek pool to west.

Garvin County: Two wells have extended the Southwest Antioch pool ½ mile northwest, both of them Gibson sand producers. Magnolia Petroleum Company's Clore 1, NW SE SW 18-3n-2w, flowed 548 barrels of 43.8-gravity oil in 12 hours through tubing from perforations in the Gibson at 6590-6625 feet. Plugged-back depth is 6693 feet. Globe Oil & Refining Company et al's Herndon 1, NW SE NW 19-3n-2w, flowed 50 barrels of 43-gravity oil per hour for 7½ hours through ½-inch choke from the Gibson, perforated at 6616-22, 6636-46 and 6652 feet. As a result of these 2 producers Globe and associates have announced location for Herndon 2, NW NE NW 19-3n-2w.

A west extension of ½ mile has been successful at The Carter Oil Company's Nichols 1, NW NW SW 14-2n-2w, Northeast Elmore pool. The well flowed 100 barrels of oil in 3½ hours through ½-inch choke from 6522-40 and 6554-59 feet. When opening was changed to ¼-inch, the well flowed 143 barrels in 9 hours. The well is the fifth producer in the field.

Harper County: That the county may receive its first commercial oil production was indicated at J. M. Huber et al's Heironymous, CNW SE 3-26n-24w. Oil and gas showed on a drill-stem test from 6200-21 feet after tool was opened 30 minutes. Slightly porous lime with a small showing of oil was drilled at 6243-47 feet. The test was drilling ahead before the zone is examined further. The county has one gas pool, the Southwest Stockholm pool, which is about 10 miles southwest of Buffalo townsite.

Pottawatomie County: A well of near-gusher proportions has been brought in by The Texas Company in the old Wanette area. Vestal 3, SE NW NE 28-6n-3e, flowed 100 barrels of 45-gravity oil per hour through 1-inch choke from the Viola lime, and has been successfully pinched. Casing was set atop the Viola at 3840 feet, and drilled in to 3900 feet, after which the zone was acidized with 1000 gallons. Skelly Oil Company started testing Royster 3, SE SE SE 21-6n-3e, and swabbed and flowed 225 barrels per day. It drilled to 4140 feet in the Viola-Dolomite, and set pipe on bottom. Pay is from perforations at 4040-60 feet.

Seminole County: Gulf Oil Corporation's Cotcha 4, NW NW SW 23-7n-6e, in the old Little River pool, swabbed and flowed at the rate of 700 barrels daily from the Cromwell sand (Pennsylvanian series). from 340-65 feet. Testing continued. Cotcha 4 was worked over after being exhausted in a deeper zone.

Hughes County: Sunray Oil Corporation has extended Grief Creek pool production ½ mile west with Chestnut 4, SE SW SE 12-7n-9e. The well swabbed 350 barrels of oil per day from the Booch sand, shallow Pennsylvanian formation, from 2906-65 feet, total detph.

Spacing Order Amended

An amended order to cover well spacing of the Hunton lime zone in the Northeast Lindsay field of McClain County, Oklahoma, has been approved by the State Corporation Commission, upon application of Walker T. Pound, conservation director. All wells drilled hereafter to the zone will be spotted in the northeast 10 acres of the quarter-quarter section in S½ of 13, all of Sects. 24, 25, 26, S½ of 27, S½ and NW of 28, in township 5n-4w, and Sects. 17, 18, 19, 20, 29 and 30-5n-3w.

Texas Fields Combined

The Dean field of Cochran County and the Slaughter field of Cochran, Hockley, and Terry counties were combined by an order of the Texas Railroad Commission issued last week. Evidence indicates that there are 26 wells in Dean and over 2000 in Slaughter—that production is from a common source. The present rules for Slaughter will govern all future production and development in the two areas.

• Kansas

Graham County Field Opened; Stafford Wildcat Finds Oil

Oil field opened in Graham County; Stafford County wildcat finds oil in Arbuckle and Lansing lime; small oil pool may be opened near Saundra pool; Operators attempting to exhaust water at Barton County wildcat; McPherson County pool opener assigned potential of 1700 barrels daily.

Graham County: An oil field has been proven by Wilcox Oil Company and associates. Rush 1, NW NE NE 9-6s-22w, several miles due north of Hill City and Alda, flowed 17 barrels of oil per hour (408 barrels per day) from the Lansing lime, from 3655-65 feet. Arbuckle lime was found dry. The test is on a block of 2500 acres with Wilcox holding a 50 percent interest.

Stafford County: Prospects of an oil pool 2 miles north of the Sand Hill pool are good at Sohio Petroleum Company's Schrepel 1, SE SE SE 12-21s-12w. Hole filled with 2400 feet of oil in 1 hour at 3517 feet in the Arbuckle lime. Lansing lime also showed for production on a drill-stem test. The well is about 2½ miles northeast of the Saundra area.

Virginia Drilling Company et al have indications of a small oil pool a mile north of Saundra pool. Wolf 1, SW SW

Wells Completed in the United States in Week Ended July 5, 1947

Data preliminary and subject to revision. Revised and more complete data on all completions and exploration shown in monthly summaries published in last issue of each month.

State or District	FIELD COMPLETIONS: New Wells: Oil	Dist.	Gas	*In-put	Dry	Total	Old Wells Deepened	EXPLORATORY COMPLETIONS: Oil	Dist.	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	This Week 1946
Alabama	1	....	....	...	...	1	....	...	...	...	2	2	3	....	....
Arkansas	2	....	....	...	3	5	....	...	...	...	....	....	5	2	2
California	17	....	....	...	2	19	1	...	...	...	6	6	26	34	38
Colorado	2	....	....	...	...	2	....	...	...	...	....	....	2	5	4
Illinois	27	....	1	...	14	42	....	1	...	...	7	8	50	30	45
Indiana	10	....	....	...	6	16	....	1	...	...	8	9	25	10	21
Kansas	21	....	6	...	5	32	2	...	...	...	13	13	47	46	41
Kentucky	5	....	....	...	4	9	1	...	...	...	4	4	14	8	19
Louisiana	21	....	1	...	9	31	....	1	...	2	6	9	40	36	18
N. Louisiana	7	....	1	...	2	10	....	...	...	...	3	3	13	27	13
S. Louisiana	14	....	....	...	7	21	....	1	...	2	3	6	27	9	5
Michigan	12	....	2	...	4	18	....	...	...	1	4	5	23	14	33
Mississippi	6	....	....	...	1	7	....	...	...	...	2	2	9	10	2
Montana	2	....	....	...	...	2	....	...	...	...	....	....	2	9	7
New Mexico	9	....	1	...	1	11	....	...	...	...	....	....	11	10	5
New York	14	....	....	15	...	29	....	...	...	...	....	....	29	31	25
Ohio	2	....	16	...	10	28	2	...	...	...	1	1	31	20	25
Oklahoma	34	....	3	...	21	58	5	2	...	...	12	14	77	92	53
Pennsylvania	21	....	14	22	5	62	....	....	....	....	....	....	62	61	52
Texas	138	2	11	...	34	185	10	9	2	1	29	41	236	195	137
DISTRICTS:															
1—S. Central	1	....	1	...	1	3	....	2	...	...	1	3	6	4	1
2—Middle Gulf	6	....	1	...	1	8	....	...	...	...	3	3	11	18	[1]
3—Upper Gulf	8	1	....	...	...	9	....	2	1	...	1	4	13	12	3
4—L. Gulf-S.W.	22	1	1	...	6	30	1	...	1	1	7	9	40	19	33
5—E. Central	2	....	1	...	...	3	....	...	...	...	1	1	4	5	[2]
6—Northeast	8	....	2	...	...	10	....	...	...	...	....	....	10	13	11
7-B—N. Central	4	....	....	...	3	7	1	1	...	...	6	7	15	17	[3]
7-C—W. Central	5	....	....	...	...	5	....	...	...	...	....	....	5	11	[4]
8—West	34	....	....	...	3	37	4	1	...	...	3	4	45	49	25
9—North	41	....	....	...	18	59	3	3	...	...	7	10	72	39	58
10—Panhandle	7	....	5	...	2	14	1	...	...	...	....	....	15	8	6
West Virginia	5	....	14	...	2	21	....	...	...	...	...	...	21	18	14
Wyoming	3	....	....	...	1	4	....	...	...	...	1	1	5	1	....
Total U. S.	352	2	69	37	122	582	21	14	2	4	95	115	718	632	541

* Includes salt water disposal wells. [1] Middle Gulf included with Lower Gulf-S.W. [2] East Central included with Northeast. [3] North Central included with North. [4] West Central included with West.

SW 11-21s-12w, showed a barrel of oil each hour natural from the Arbuckle lime at 3502-23 feet.

Barton County: Operators are attempting to exhaust water at the Hunt 1-A, wildcat in NE NE NE 12-17s-14w, northwest of the Boyd pool. On preliminary tests the well bailed 45 barrels of oil and 22 barrels of water in 24 hours from Lansing lime at 3196-3200 feet. Testing of the formation will continue.

McPherson County: Westgate-Greenland's new pool opener, Robinson 1, NW NW SE 31-17s-1w, has been assigned a state potential of 1717 barrels of oil daily from the Mississippi chat. The well opened Georob pool.

• West Texas

Silurian Output to Cover Big Area in Dollar Hide

Silurian production to cover considerable area in Dollar Hide field; south extension sector of Fullerton field yields large outpost producer; Silurian production in prospect for Goldsmith field; 3 counties list wildcat failures in Ellenburger.

Andrews County: The Pure Oil Company et al's Codwen 1, C SE SW PSL 24, Block A-52, 15/16 miles northeast of Devonian production in the Dollar Hide field and capable of flowing production from this zone, is showing for an oil producer from the underlying Silurian. Drill-stem tests of the Silurian, tooped at 8210 feet, or 40 feet low to the field's single producer from this lower zone, yielded oil- and gas-cut mud at 8488-520 feet and 8520-55 feet, while a test at 8555-605 feet returned 1200 feet of oil and 120 feet of oil- and gas-cut mud. The well was deepened to 8655 feet, where test was pending.

Union Oil Company's Cowden 3, C SE NE PSL 7, east edge of Devonian production, entered the Devonian at 7590 feet, with elevation 3146 feet, and the Silurian at 7820 feet, with considerable thinning of the Devonian beds. A drill-stem test at 8470-530 feet resulted in a steady oil flow at an estimated rate of 30 barrels hourly. Pipe was cemented on top of the Silurian pay for completion. These 2 Silurian-pay outposts proved the zone for production for 1¾ miles along a northwest-southeast trend. A structurally-low failure forestalls important extensions southeast, but the north trend is open for important additions to the proved acreage.

Frank and George Frankel's University 1-L, C NE NE Sect. 43, Block 13, ½ mile from Clear Fork production in the sector of the Fullerton field, flowed 85 barrels of oil on 5-hour test through ¾-inch choke after acidizing Clear Fork open hole at 6900-7035 feet with 8500 gallons. Possibly 100 proved Clear Fork locations were conceded early this year for the south extension sector of the Fullerton field, and it is now evident that this forecast will be surpassed.

Ector County: Gulf Oil Corporation's Goldsmith 430-E, ⅝ mile northwest of its Devonian-pay discovery for the Goldsmith field and a prolific well in this deep zone, apparently confirmed the Silurian for production in developing 300 feet of 41.5-gravity oil and 240 feet of heavily oil- and gas-cut mud when tester was used at 8492-522 feet. This deeper zone proved thin, and the well was drilling at 8671 feet to explore the Ellenburger. Goldsmith 421-D, the deep discovery in process of being worked over due to water breaking through cement, was making test of new perforations at 8735-55 feet.

Gulf and Kewanee Oil Company's University 1-A ¾ mile southeast of the Ellenburger oil discovery for the Jordan field, entered the Silurian at 7970 feet, or 237 feet low, but tested 660 feet of oil and 340 feet of oil- and gas-cut mud when tester was used at 8230-80 feet. It was drilling at 8487 feet to explore the Ellenburger before setting pipe.

Deep Failures: Humble Oil & Refining Company's Harrell 1, Scurry County wildcat, entered Ellenburger at 7425 feet, and quit in water at 7563 feet. In Crockett County, Amerada Petroleum Corporation's University 1-CTA, quit after developing nominal amount of oil from perforations in Ellenburger logged from 8102 feet to 9080 feet, with the hole bottomed in Wilberns. The Texas Company's Connell 31, Crane County wildcat, tested water at 9931-67 feet in Ellenburger, topped at 9805 feet, and has plugged back to set pipe for production test of oil shows in the lower Permian. The company's Alan Connell 1, 2 miles south and structurally low, abandoned in Devonian at 7637 feet. In Ector County, Cities Service Oil Company and Sinclair Prairie Oil Company's Wooten 1, plugged after testing a small volume of oil and water from Strawn at 7990-8105 feet, having plugged back from Devonian at 8335 feet.

Crockett County: Cities Service Oil Company's Hobbs 1, west offset to its flowing discovery from perforations at 5670-75 feet and opposite the Permian-Pennsylvanian contact, was due to perforate higher after testing sulphur water with trace of oil at 5745-50 feet. It is structurally low. Plymouth Oil Company's Owens 1-OA, east offset to the discovery failed to indicate production when acidized in open hole at 5784 feet, with tubing packer at 5673 feet. Plymouth's Owen 2-OA, north offset to the discovery and structurally high, logged first oil porosity at 5606 feet, with elevation 2425 feet, and a drill-stem test at 5662-90 feet yielded oil flow at the rate of 30 barrels hourly. Pipe will be set for completion. The temporary setbacks prevented a big drilling program from getting under way in the area.

Extensions: Western Drilling Company-Jas. A. Edmiston, Jr.'s Gregg-Texaco 1, southwest corner of Labor 25, League 731, and 1½ miles north by west of production in the Levelland field, Hockley County, filled 1000 feet with fluid, mostly oil, and the fluid column could not be lowered by swabbing after using 5000 gallons of acid. Production is from saturations at 4798-833 feet in San Andres, topped at 3800 feet with elevation 3567 feet. The outpost is 12 to 15 feet above the bottom of the hole of nearest producers, and can deepen with risk of formation water. In Garza County, Progress Petroleum, Inc.'s Rogers 1, situated on a 21-acre lease, J. V. Massey Survey, extended the Post area ¾ mile northwest in pumping 25 barrels of oil and 107 barrels of water initial after acidizing broken pay at 2965-3024 feet.

Gaines County: Amerada's Jones 2-A, inside well and highest well in the Jones Ranch field, flowed 1053 barrels initial through ½-inch choke after acidizing perforations at 11,276-332 feet and 11,348-88 feet. The Simpson-granite contact was logged at 12,900 feet, thus eliminating the Ellenburger as a prospective oil zone.

• West Central Texas

Jones County Multi-Pay Test Plugs Back for Completion

West Central Drilling Company et al's Wimberly 7-A, Jones County, near apex of the Wimberly structure, which has accounted for 8 oil-producing zones to the 2600-foot level, failed to encounter additional pays in drilling to water in the Hickory (Cambrian) sand at 5647 feet, and has been plugged back to dual-complete from the Lower Hope and Cook zones. Barren Ellenburger was entered at 5156 feet, with elevation 1752 feet, and the Hickory at 5609 feet. Operators in the field shared the cost of the initial deep test on a basis of production allowables.

Stephens County: Fred M. Manning, Inc., and Sinclair Prairie Oil Company's Mueller 2, NEc TE&L Co. Sect. 2258, and northeast offset to their flowing discovery, was making completion try from perforations at 3371-76 feet in Bend, topped at 3288 feet.

Refining Firm Formed

Ona Refining Company has been organized to purchase and operate the Moutray Oil Company's 1000-barrel daily capacity crude refinery near Hawley, Texas. The plant has been inactive since June 1, 1946. The new owners are seeking crude supply by tank truck from isolated fields in West Central Texas.

THE OIL MAN'S CALENDAR

JULY 26	Illinois Oil & Gas Association and Illinois Basin Chapter, API, Annual Mid-Summer Meeting, Robinson, Ill.
AUG. 11–13	Interstate Oil Compact Commission, Great Falls, Mont., Rainbow Hotel.
25–27	Annual Appalachian Gas Measurement Short Course, West Virginia University School of Mines, Morgantown.
SEPT. 10–11	Rocky Mountain Oil & Gas Association, Fall Meeting, Casper, Wyo.
17–19	National Petroleum Association Annual Meeting, Atlantic City, Traymore Hotel.
23–24	Fall Meeting, Petroleum Division, AIME, Los Angeles, Elks Club.
29–30	Annual Meeting Independent Petroleum Association of America, Oklahoma City.
28 to Oct. 2	Regional Meeting, AIME (includes 2-day Petroleum Division Session). Denver.
OCT. 6– 8	American Gas Association, Annual Meeting, Cleveland.
6– 8	ASME Petroleum Mechanical Engineering Conference, Houston.
8–10	Fall Meeting, Petroleum Division, AIME, Tulsa, Mayo Hotel.
13–15	Annual Meeting, American Association of Oil Well Drilling Contractors, Long Beach, Calif.
16–17	Texas Mid-Continent Oil & Gas Association, Annual Meeting, San Antonio, Gunter Hotel.
NOV. 10–13	American Petroleum Institute Annual Meeting, Chicago, Stevens Hotel.
1948 MAY 15–22	International Petroleum Exposition, Tulsa.

Nomads Chapter monthly meetings: LOS ANGELES, second Wednesday, Jonathan Club. HOUSTON, second Monday, Ye Olde College Inn. NEW YORK, first Monday, Louis Sherry's. TULSA, third Wednesday, Hotel Tulsa. DALLAS, date not yet fixed.

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• North Texas

Grayson County New Oil Pay Has Unusually Thick Sand

New oil pay in Grayson County field has unusually thick sand; Burns-Benson deep area extended southwest into Young County; Archer County wildcat showing for small pumper from Strawn.

Grayson County: The Texas Company's Handy 5, Sam Stewart Survey, and an offset to its two 1700-foot wells in the Handy field, missed the discovery zone but logged 60 feet of solid oil sand in drilling the Strawn to 2162 feet. A drill-stem test at 2102-22 feet yielded gas to the surface within 46 minutes and the recovery consisted of 75 feet of 38-gravity oil and 18-feet of heavily oil- and gas-cut mud. A drill-stem test at 2122-62 feet resulted in a steady flow of oil within 9 minutes, with shutin bottom-hole pressure calculated at 1000 pounds. Pipe was cemented at 2102 feet to complete. Nearby failures emphasize the erratic performance of the oil pays in this area.

Standard Oil Company of Texas has replaced its second scheduled Ellenburger test for its Sherman prospect with a new location on the W. F. Covey 10-acre lease, J. B. McAnair Survey, A-763. This projected 10,000-foot test was to have been on the I. C. Bates 43-acre tract.

Young County: L. T. Burns, discoverer of the steadily expanding Burns-Benson deep area in Archer County, extended this field 1¼ miles southwest into Young County, when Campbell 1-C, NE NW TE&L Co. 1376, registered initial flow of 225 barrels of 43-gravity oil through 15/64-inch choke. Production is from perforations at 4464-76 feet in Bend, topped at 4464 feet with elevation 1163 feet. The field was recently extended southeast into Young County, or 3¼ miles due east of the above outpost. The intermediate acreage is untested for deep production. Burns-Benson field offers the largest undrilled proved acreage in the district.

Archer County: Panhandle Refining Company's Zotz 1, NEc Sect. 52, Block 3, Clark & Plumb Survey, 3 miles southeast of Scotland, was showing for a 15- to 20-barrel pumper after nitro shot in Strawn at 4050-84 feet, having plugged back from 5379 feet. The Bend was entered at 5268 feet, with elevation 955 feet, correlating 19 feet low to a recent Ellenburger failure 1¼ miles east in Clay County.

Officers Selected by AGA Nominating Committees

General and sectional nominating committees of the American Gas Association have announced their selections for officers for the 1947-1948 association year, subject to election at the annual convention in October.

Hudson W. Reed, president, The Philadelphia Gas Works Company, Philadelphia, has been nominated president. Other selections include Robert W. Hendee, president, Colorado Interstate Gas Company, Colorado Springs, first vice president; Hugh H. Cuthrell, vice president, The Brooklyn Union Gas Company, second vice president; and Edward F. Barrett, president, Long Island Lighting Company, reelection as treasurer.

Slated as new directors for a two-year term are Walter C. Beckjord, Cincinnati; Edward G. Boyer, Philadelphia; Henry R. Cook, Baltimore; Earl H. Eacker, Boston; Joseph N. Greene, Birmingham; D. A. Hulcy, Dallas; F. A. Lydecker, Newark; James S. Moulton, San Francisco; Edward P. Noppel, New York; John A. Robertshaw, Youngwood; W. H. Rudolph, Newark; Louis B. Schiesz, Indianapolis; Edward J. Tucker, Toronto; Harry K. Wrench, Minneapolis; and C. H. Zachry, Dallas.

Other nominations are as follows: Laboratories' managing committee, A. F. Bridge, Los Angeles, chairman, and C. E. Bennett, Pittsburgh, vice chairman; accounting section, John A. Williams, Syracuse, chairman, and L. E. Reynolds, Hartford, vice chairman; industrial and commercial gas section, Leon Ourusoff, Washington, chairman, and Bernard T. Franck, Milwaukee, vice chairman; manufacturers' section, D. B. Stokes, Burlington, chairman; publicity and advertising committee, R. G. Barnett, Portland, chairman; residential gas section, C. S. Stackpole, Baltimore, chairman, and W. M. Jacobs, Los Angeles, vice chairman; technical section, A. C. Cherry, Cincinnati, chairman, and S. J. Modzikowski, Chicago, vice chairman.

The general nominating committee is composed of Edward G. Boyer, chairman, J. H. Collins, E. M. Farnsworth, LeRoy M. Edwards, Bernard T. Franck and H. N. Mallon.

• East Texas

Hawkins Field Receives New Gas-Distillate Production

Hawkins field gains new gas-distillate producing zone through plugging back of district's record-depth test; 2 wildcats in Anderson County have nominal oil shows.

Wood County: Humble Oil & Refining Company's McKnight 1, northeast flank of the Hawkins field, confirmed production passed up in drilling to salt at 14,629 feet, in making gas-distillate flow from Rodessa open hole at 8935-65 feet on gauge through ¼-inch choke after 500 gallons of acid, the gas volume was 1,250,000 cubic feet daily and 11 barrels of 52-gravity distillate in 6 hours. Tubing pressure was 1250 pounds during this test. This deep prospect has been active since May 30, 1946, and has cost about $500,000.

Humble's Rio Oil Corporation 1, Yantis prospect that passed up gas-distillate production in the 7700-foot Rodessa zone, was attempting to recover stuck drill pipe at 4046 feet. The well is bottomed at 8390 feet in dry Travis Peak, topped at 8275 feet. It is slated to be deepened to water before plugging back for completion in the Rodessa.

Shell Oil Company's Goldsmith 12, initial deep test for the Quitman field that reached the salt plug at 11,158 feet without attaining its Smackover objective, was making a production test of perforations opposite nominal porosity in the upper part of the Georgetown lime, topped at 4996 feet. A small yield of gas and distillate from Rodessa perforations did not prove commercial.

Anderson County: Sanders and Murchison's Broadway 1, 3 miles east by south of Blackfoot, was due to make a drill-stem test after developing small oil and gas showings with rotary returns at 8365-68 feet while drilling Basal Rodessa. First anhydrite stringer was logged at 8100 feet. Continental Oil Company and Byrd & Frost, Inc.'s Royall 1, Slocum prospect, was drilling at 7980 feet after testing dry at 7923-65 feet. Nominal showings of oil and gas from the Basal Glen Rose was reported in cuttings at 7928-42 feet.

Harrison County: Stanolind Oil & Gas Company's George Slaughter 1, J. E. White Survey, 9 miles north of Marshall, took a 13-minute drill-stem test from 7399-418 feet, using ¼-inch chokes and recovered only drilling mud with no showings. The wildcat is drilling below 7576 feet in the Travis Peak, topped at 6561 feet by samples.

Shelby County: L. E. Winslow is planning 5 more operations, 1 a deep test in the Shelbyville area. Lilly 1, C. C. Tutt Survey, has indicated production, and preparations were being made to test the wildcat, which is bottomed at 4050 feet. The well is said to have logged unidentified pay section at 2450-70 feet and a possible productive chalk section at 2770-975 feet by electrical survey.

• South Central Texas

Wildcat in Lytton Springs Section Being Given Tests

Tests being made in Lytton Springs area wildcat, Caldwell County; Magnolia's Frio County deep test below 10,-300 feet; Texas Company to test new Del Monte field well.

Caldwell County: Novak & Hillard were testing Ben Forester et al 1, wildcat 2 miles west of Lytton Springs in Pablo Martinez Grant, with no details released. The test had an oil show at 1870-900 feet in Austin chalk. Total depth is 2123 feet with 5½-inch casing set to 1953 feet. The Buda lime, topped at 1917 feet, also showed oil at 1917-30 feet.

Frio County: Magnolia Petroleum Company is drilling below 10,300 feet in Wm. McKinley 1, deep wildcat 1½ miles northeast of Pearsall. The Edwards lime was topped at 5605 feet. The wildcat is scheduled to drill on to 12,000 feet.

Zavala County: At Del Monte field, The Texas Company was preparing to test the Cross S. Ranch 3, located 1320 feet northwest of the No. 1 discovery. Total depth is 3364 feet in sidetracked hole with 7-inch casing set to 3357 feet. The discovery was completed in February from open hole at 3303-34 feet, flowing 73 barrels of 25.9-gravity oil daily through 3/16-inch choke.

• Southwest Texas—Lower Coast

Oil and Gas-Condensate Field Discovered in Aransas County

Aransas County wildcat being dually completed as discovery of oil and gas-condensate field; Kleberg County wildcat tests gas; Bishop field well indicates production from new pay; new pay discovered at Los Indios field.

Aransas County: William Herbert Hunt Trust Estate's Spencer-Crane 1, wildcat 4½ miles north of Rockport, is being completed as the discovery well of an oil and gas field. The well is being dually-completed with perforations at 7058-65 feet for a gas-condensate com-

pletion and at 7126-36 feet for an oil completion. A drill-stem test at the lower horizon flowed 76½ barrels of oil in 6 hours through 3/16-inch choke with 1175 pounds working pressure. No gauge of the gas-condensate sand has been made. Total depth is 8370 feet.

Kleberg County: Stanolind Oil & Gas Company's J. O. Johnson 2, wildcat 3½ miles southeast of Kingsville and 1½ miles northwest of Ricardo field, has tested gas at the 7800-foot level. A drill-stem test at 7830-36 feet, using ¼-inch and 3/16-inch chokes, flowed 6,250,000 cubic feet of gas in 10 hours with 1300 pounds working pressure and recovered gas-condensate cut mud. A 16-hour drill-stem test in the same perforations flowed at the rate of 1½ million cubic feet of gas and 25 barrels of condensate and mud daily with 1700 pounds working pressure. Following this test hole was plugged back and perforated at 6198-6204 feet where a drill-stem test was to be run.

Nueces County: H. R. Smith and W. C. McBride, Inc.'s King Ranch 1, 990 feet west of the Kaiser 1 discovery at Bishop field, has indicated a new gas-condensate pay. A drill-stem test at 7085-89 feet developed 800 pounds working pressure in 10 minutes and recovered 60 feet of condensate, ¼-inch chokes being used top and bottom. Hole was drilled below 7130 feet following this test.

Hidalgo County: The Chicago Corporation's Richard King Estate 3 has discovered a new deep gas pay at Los Indios field. From perforations at 8447-63 feet the well flowed 1,325,000 cubic feet of gas daily on open flow with shut-in pressure 3875 pounds. Total depth is 9130 feet with 5½-inch casing set to 8882 feet.

• Middle Texas Coast

Wildcat in Yoward Field Area Tests Gas and Condensate

Wildcat southwest of Yoward field tests gas and condensate; mile northeast extension at Yoward tests oil and gas-condensate; gas production extended in Matagorda Bay field; 2 oil pays discovered on south flank of La Gloria field.

Bee County: Rowan & Hope's Rio Oil Corporation 1, wildcat 2 miles southwest of the new Yoward field, has tested gas-condensate on a drill-stem test in the Slick sand. A drill-stem test at 7525-45 feet, using ¼-inch chokes, started flowing the water cushion in 5 minutes with 500 pounds working pressure and recovered 1000 feet of water cushion and 550 feet of condensate-cut water cushion, bottom hole pressures being 3100 pounds open and 3200 closed. Another test at 7550-65 feet through ¼-inch and ⅜-inch chokes yielded similar results. Hole was drilled ahead following these tests and presently drills below 7770 feet.

Mills Bennet & Anderson Prichard's Sherwood 1, extension test a mile northeast of Yoward field, recovered oil on a drill-stem test in the Slick sand and in the Luling sand. At 7507-12 feet in the Slick, using ¼-inch chokes top and bottom, the well developed 50 pounds working pressure in 20 minutes and recovered 150 feet of clean oil and 50 feet of oil-cut mud, bottom hole pressure flowing being 860 pounds and 2600 pounds closed. A drill-stem test in the Luling sand at 7647-53 feet developed 14 pounds working pressure in 30 minutes and recovered 100 feet of oil, cut with mud and salt water, 1000 feet of oil-cut salt water and 900 feet of salt water. Another test at 7639-45 feet developed 11 pounds working pressure in 30 minutes and recovered 65 feet of muddy water.

Calhoun County: The Texas Company's State 1, Tract 130, has extended production in the Matagorda Bay field 7500 feet northeast. On completion the well flowed 17½ million cubic feet of gas daily on open flow. Total depth is 5780 feet with 7-inch casing set to 4780 feet and perforated at the 4700-foot level for completion. The well lies 7500 feet northeast of the State 1, Tract 118, discovery well for the field.

Brooks County: Ralph E. Fair and Jack Woodward, Inc.'s Fee 10 has discovered 2 new oil pays on the south flank of LaGloria field. Originally drilled as LaGloria Operators Committee's South La Gloria Unit 5, the well was completed in December, 1942, as a dual-sand gas-condensate well at 6770-90 feet and 5995-6030 feet, old total depth 7400 feet. It was later deepened by the committee to 8306 feet but tested salt water in the deeper zones and the well turned over to Fair and Woodward, who own the oil rights. The well has been completed from perforations at 6882-92 feet where it gauged 183 barrels of 41-gravity oil daily on 9/64-inch choke with gas-oil ratio 925/1. Second completion is at 6980-90 feet, where the well flowed 171 barrels of 42.6-gravity oil daily on 7/64-inch choke with gas-oil ratio 1355/1.

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• Upper Texas Coast

Tide Haven Confirmation Well Tests Gas and Condensate

Tide Haven field confirmation well flows gas and condensate on initial test; new producer finaled at Frelsburg; Boling Dome south flank well completed; deep Port Neches test plugged back for regular field pay completion.

Matagorda County: Magnolia Petroleum Company's W. L. D. Sartwelle 1 has confirmed production in the Tide Haven discovery area. Located ¼ mile due south of the Live Oak Farms 1 discovery, Sartwelle 1 was drill-stem tested at 8705-10 feet where it flowed at the rate of 95 barrels of 53.3-gravity condensate and 3,125,000 cubic feet of gas daily through ¼-inch chokes. Flowing pressure on the tubing was 2338 pounds and shutin pressure, 3089 pounds. Production is from a new deeper sand than that of the discovery, which produces from the 8450-foot level.

Colorado County: A producer in the Frelsburg field is Sinclair Prairie Oil Company's John Warschak Unit 1. On potential the well flowed 138 barrels of 58.8-gravity condensate and 3,360,000 cubic feet of gas daily through ¼-inch choke with flowing pressure on tubing 1980 pounds and shutin, 3178 pounds. Total depth is 10,113 feet with 5½-inch casing set to 9442 feet and perforated at 8497-8509 feet for completion. This well also tested gas and condensate from perforations at 9197-203 feet.

Wharton County: On the southwest flank of Boling Dome, Maynard Smith's Robert Horton 1, located in Lot 20, Block 1 at Iago townsite, has been completed as a producer. On potential the well flowed 181 barrels of 29.1-gravity oil daily through 10/64-inch choke with 600 pounds tubing pressure and 800 pounds casing pressure, gas-oil ratio being 480/1. Total depth is 5237 feet with 5½-inch casing set to 5327 feet and perforated at 5296-5304 feet for completion.

Orange County: The Texas Company's H. J. Kuhn 27, deep test at Port Neches field, has been plugged back for completion in the regular field pay. Drilled to total depth of 8002 feet, hole has been plugged back and casing perforated at 5996-6002 feet where the well flowed 113½ barrels of oil daily through 7/64-inch choke with 900 pounds pressure equalized on the tubing and casing.

New Big Horn Basin Map

The Geological Survey has published a revised geologic structure-contour map of the Big Horn Basin in Wyoming and Montana, one of the most active areas of prospecting and development in the country.

The map covers an ellipse-shaped area about 170 by 70 miles, and an inset map of the oil and gas fields shows their relation to the regional geology and indicates for each field the age of the principal productive formations, the name and depth of the oldest productive formation and the name and depth of the oldest formation tested or penetrated.

Copies of the map, issued as Preliminary Map 74 of the Oil and Gas Investigations series, may be secured at 50 cents each from the Survey offices in Washington, Casper, Wyo.; Tulsa, Denver, or Billings, Mont.

• South Louisiana

Eola Field Given Southwest Extension by Atlantic Well

Eola field production extended 1½ miles southwest; new pay sand discovered at Rabbit Island; casing run in deep Queen Bess Island area wildcat; Houma gas-condensate production extended 1½ miles north.

Avoyelles Parish: The Atlantic Refining Company's Haas Investment Company 1, 10-2s-2e, has extended the Eola field 1½ miles southwest. On initial tests the well flowed 169 barrels of oil daily through ⅛-inch choke with gas-oil ratio 913/1. Total depth is 8661 feet with 7-inch casing set to 8655 feet and perforated in the Wilcox at 8562-72 feet for completion. The Wilcox was topped at 8375 feet.

Iberia Parish: At Rabbit Island field The Texas Company's State-Rabbit Island 10 (Lease 340) has opened a deep gas horizon. From perforations at 10,545-568 feet the well flowed 5½ million cubic feet of gas daily through ¼-inch choke with 3950 pounds tubing pressure flowing and 4200 pounds shut in.

Jefferson Parish: The Texas Company was running casing into the Lafourche Basin Levee District 1, deep wildcat in the Queen Bess Island area that bottoms at 15,523 feet. As to what depth the 5½-inch casing would be set was not learned but it is reported that a gas-condensate show between 11,000 and 12,000 feet will be tested. This well is 1½ miles west of the State 1 gas well and is in 30-20s-25e.

Lafourche Parish: In the area north of Valentine field Joe W. Brown's Valentine 1 has been completed as the second producer. Drilled to total depth of 10,470 feet, hole was plugged back and sidetracked to present depth of 9863 feet, where 7-inch casing has been set on bottom. On completion the well flowed 15 barrels of condensate and 1½ million cubic feet of gas daily on 9/64-inch choke. This producer is 2000 feet northwest of Brown's Duson 3 and in 46-17s-20e.

Terrebonne Parish: Union Oil Company of California's J. C. Dupont 1 has extended Houma gas and condensate production 1½ miles north. On potential the well flowed 130 barrels of 50.1-gravity condensate and 6½ million cubic feet of gas daily through 16/64-inch choke with 4750 pounds pressure. Completion was in a new sand for the field at 11,930-50 feet.

Phillips Makes Grant

The Frank Phillips Foundation has given $100,000 to Lafayette College, Easton Penn. Phillips is a trustee of the college, and chairman of the board of directors of Phillips Petroleum Company, Bartlesville, Okla.

• Mississippi

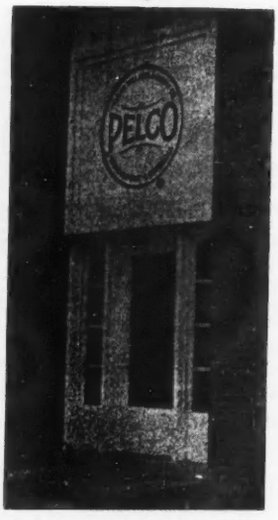
Gulf's Jones County Deep Test Continues With Cores

Jones County deep test continues with cores; Mallalieu field in for good development.

Jones County: Gulf Refining Company's L. L. Majors 1, SEc NE 29-6n-11w, deep wildcat, was preparing to drill after reaching a total depth of 12,537

Sheep Shearing

In St. Louis, and this is typical, lithographers have been instructed to demand a 36¼ hour week for day shifts, a 32½ hour week for night shifts, from $15.00 to $19.00 more money per week, an extra man on each press, and union supervision of who each plant shall work for or place work with. How would you like to own a litho plant? Private industry has begun to ask itself what there is to balance with taxes, government regulations and union domination. And what hope of independent achievement has any person who belongs to a union? Incentive, for both industry and labor, is gone. And they know it. We cling like drowning men to the legend of American independence while union leaders, and politicians blind to the wishes of their own constituents, sell us down the river.



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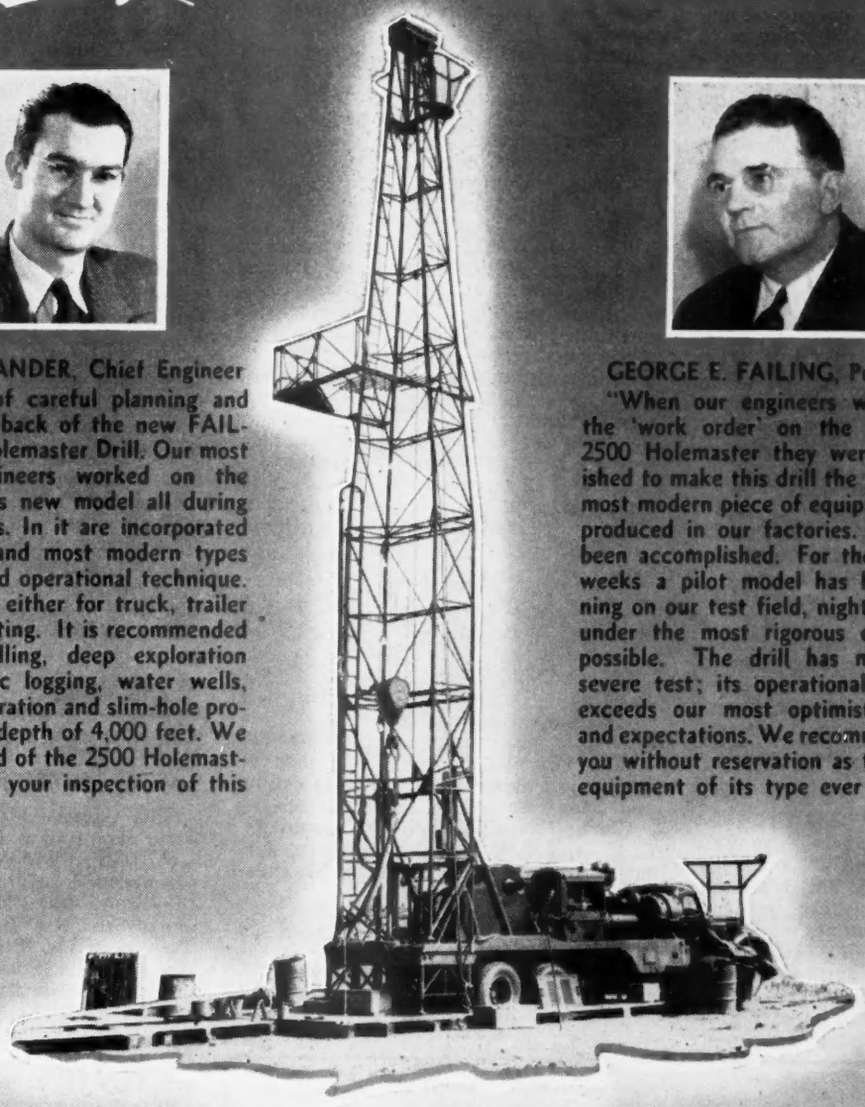

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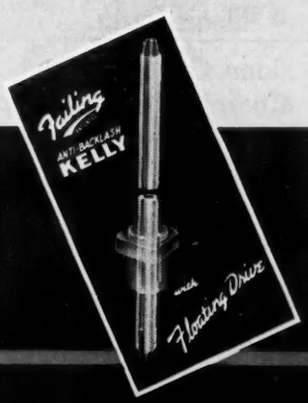

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feet. Cores in the last 100 feet recovered shale with a few thin sandy streaks, but no new shows have been noted below 12,370 feet. Most encouraging results in the lower levels of the hole were from the drill-stem test at 12,114-34 feet which recovered 683 feet of 33.1-gravity oil and 30 feet of gas-cut mud in 30 minutes to establish the deepest potential production yet reported in the state.

Union Sulphur Company's Earline Parker 1, NEc 31-10n-10w, was running core tests below 6787 feet in black shale. After noting several productive shows in various sections of the Eutaw, topped at 5366 feet, Tuscaloosa was marked at 5901 feet.

Yazoo County: The Carter Oil Company's Medie Morgan 1, SW NE 9-12n-3w, wildcat about 15 miles north of the Tinsley field, was preparing to run core tests below 6350 feet. The structure is reported running about 165 feet higher than the Carl Day 1, diagonal offset abandoned earlier in the year. No shows have been noted. R. Thomas McDermott's Pauline Gaddis 1, NW NW 32-10n-1w, Tuscaloosa test, is drilling below 5870 feet with no shows.

Lincoln County: Humble Oil & Refining Company's M. C. Randall 2, SEc 17-6n-8e, has been successfully completed to mark the beginning of what may be a rapid development of the Mallalieu field. The Randall flowed 405 barrels of 40.8-gravity oil per day with no salt water. Mallalieu has been plagued in the the past with a number of dry holes but at the present time there are 11 tests drilling with 1 on the verge of completion. This is Humble's J. M. Chandler 1, SWc 8-6n-8e, which was swabbing oil with some wash water from the lower Tuscaloosa below 10,460 feet.

Jasper County: The Soso gas field, opened by Gulf's Edwards Bailey 1 in the early part of 1945 but remaining virtually dormant ever since, is being reactivated with 2 attempts to extend production over the line into Jones County. Union Producing Company's Massey 1, 28-10n-3w, has been located and Gulf's W. W. Jackson Gas Unit "A" 1, 26-10n-3w, has rigging up for a test about ¾ mile east of production. The Edwards-Bailey established production in the Eutaw zone below 6310, and in the first 9 months of its existence had a cumulative production of 112,526,000 cubic feet of gas and 2853 barrels of condensate.

Simpson County: Hunt Oil Company's Smith County Oil Company 4, NW SW 15-2n-6e, is drilling below 3896 feet in a drive to the Tuscaloosa zone. No shows have been reported.

Washington County: C. H. Murphy, Jr.-Sun Oil Company's E. J. Ganier 1, SE NW 30-15n-6w, and the operator's W. B. Swain 1, SW SW 29-15n-5w, are drilling below 4035 feet on the flanks of the Sharkey platform. So far no success has been noted in any of these tests, which are seeking a Eutaw Tuscaloosa pinchout. No shows have been reported in the 2 tests now drilling.

Rankin County: Lion Oil Company's W. G. Sowell 1, SW SE 7-5n-5e, has been abandoned at 7808 feet for one of the deepest tests ever drilled in the county. The well was driven through the potentially productive Massive sand zone, topped at 7463 feet, to the Comanchean with no shows noted at any point.

Alabama

The Carter Oil Company's Herbert Mosely 1, NE SW NE 3-10n-3w, East Gilbertown field of Choctaw County, has been completed for an initial production of 17 barrels of 18-gravity oil per day from the Eutaw zone. Gilbertown has been very quiet since the first of the year but activity has been resumed and there are now 2 tests drilling and 1 location set up, all by Carter.

Clarke County: Shell Oil Company's C. C. Brooks 1, NW NE 11-8n-1e, wildcat, is drilling below 4840 feet. No shows have been reported.

Florida

Humble Oil & Refining Company's Gulf Coast Realty Company 9, C SE¼ 24-48s-29e, Sunniland field, Collier County, has pulled tubing and rods and was waiting on orders after apparently successfully establishing production. On a drill-stem test at 11,566 feet the well recovered 3500 feet of oil in a 60-minute period. The well is 1 mile west and 660 feet north of the Gulf Coast Realty 8. Humble is also rigging up its Gulf Coast Realty Company 11, C N½ NW SW 20-48s-30e.

Clay County: Humble Oil & Refining Company's Foremost Properties 1, NE SW 4-6s-25e, wildcat, is drilling below 4915 feet with no shows reported.

Franklin County: Magnolia Petroleum Company's State Block 5-B A-1, in an offshore area, is drilling below 3422 feet in a test that should go below 6000 feet. No shows have been noted.

Palm Beach County: Deepest test now drilling in Florida is Humble's Tucson Corporation 1, 35-43s-40e, 16 miles west of W. Palm Beach. The test is below 12,600 feet without shows.

Georgia

T. R. Davis' Bonny Brown 1, southeast of Lyons, in Toombs County, is drilling and coring below 2815 feet. A drill-stem test was run at 2500 feet which showed a good blow with 1150 pounds bottom hole pressure. Operator recovered mud and water with oil and gas, but in non-commercial quantities. The well is drilling tight.

• Michigan

Stony Lake Field Area Test Cores Traverse Lime Pay

The Carter Oil Company cored Traverse lime pay at 1683-724 feet on Schiller 2, NE SE SW 10-13n-18w, Oceana County, a location on the west side of the Stony Lake field, and was drilling ahead to test Dundee-Monroe beds. Two previous lower horizon tests carried gas-oil shows but failed to produce commercially.

Rowmor Corporation's Weber 1, SE SW NE 8-13n-18w, 2 miles west of the Stony Lake field, bottomed out dry in the Traverse at 1649 feet. It was about 100 feet lower than the field.

Newaygo County: Sun Oil Company's Cattanach 3, NE SW SW 11-12n-13w, on the east side of the Kimball Lake pool, caught fire during completion and burned 60 hours before it was killed. Damage to Union Rotary, Inc.'s rig, equipment and loss of oil was estimated at $40,000. On previous tests the well flowed at a rate of 70 barrels per hour from Traverse lime at 2333 feet.

Bay County: Reese and McClanahan's Maida 1, SW SE SW 18-17n-4e, ½ mile east of the Mt. Forest discovery well, flowed and swabbed 16 to 21 barrels of oil on daily tests over a 5-day period from the Dundee at 3012 feet. It will be acidized.

• Illinois Basin

Bond County, Illinois, Test Completed as Pool Opener

Bond County prospects brighten; new Indiana pool assured.

Illinois

Leo H. Horton's Kokorudz 1, SW SE NE 21-6n-2w, Bond County, 2 miles

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south of the Woburn pool, has been completed as the South Woburn pool opener after pumping 70 barrels of oil in 24 hours from Trenton lime at 3150-65 feet. Same operator was rigging rotary tools for Stoecklin 1, SW SE SE 16-6n-2w, ½ mile due north of Kokorudz 1.

White County: Central Pipe Line Company's Poole 1, NW SW NE 25-6s-9e, 1½ miles east of the Herald pool, swabbed 240 barrels of oil in 13 hours after 3000 gallons of acid in O'Hara lime at 2960-65 feet. The treatment was made through perforations opposite the pay.

Wayne County: Robinson and Puckett's Parardi 1, SE NW SW 17-1s-8e, a mile east of the Jeff pool, made 110 barrels of oil in 24 hours on pump from Aux Vases sand at 3115-35 feet. The well was given a 30-quart shot. The Jeff pool has been included in the Clay City Consolidated pool.

Shelby County: National Associated Petroleum Company's Shelby Loan and Trust Company 1, NW SE NW 17-10n-4e, is drilling below 1500 feet in semi-wildcat territory.

Indiana

H. E. Ledbetter's Elkins 1, NW SW NE 12-1s-12w, Knox County, 2 miles northeast of the Mt. Carmel pool, swabbed 304 barrels of oil in 33 hours from Bethel sand at 2156-64 feet to open a new area.

• Ohio

Production Extended West By Zanesville Area Well

Zanesville extension found; Good Medina well completed in Blue Rock; Hemlock Grove extended; small well at Tropic; 2 wildcats in Stark County.

Muskingum County: Atha Realty Company drilled in a good well on the Nathalia Myers tract in Lot 87, Washington township, just north of Zanesville and a mile west of the present field. Clinton sand at 3766-815 feet showed some oil with 400,000 cubic feet of gas at 3795 feet, and 1,200,000 cubic feet at 3808 feet. Drilling was stopped at 3815 feet and the well tubed without shooting. Rock pressure was 1150 pounds.

A better-than-average Medina sand well was completed by National Gas and Oil Corporation on USA 5-Swisher, N ½ SW 3 Blue Rock. Medina sand at 4328-34 feet was shot with 20 quarts and flowed 52 barrels the first 24 hours. The well is in the center of ½ square mile of undeveloped acreage.

Meigs County: Preston Oil Company's Wm. McNett 3, SE NW 33 Orange, made 30 barrels in 24 hours after shot. Berea sand was reported at 1734-44 feet with 10 barrels in 60 hours natural. The completion is along the east edge of the Hemlock Grove pool.

Morgan County: Zanesville Tool and Supply Company's Dell Rambo 1, NW SE 26, York, was dry in the Clinton sand and made only 200,000 cubic feet of gas in the Medina. The well was drilled 5 feet in to a total depth of 3981 feet, and may be tubed without shooting.

Stark County: Two wildcats have been staked in the Sandyville area. Republic Steel Corporation has moved tools to its own property in NW NE 19 Perry. Frank Lyons et al have made a location on I. & B. Snode, SE SW 20 Lexington.

• California

Salt Creek Field Has Gas Discovery in Oceanic Zone

Gas discovery made in Oceanic zone in Salt Creek field; Shell working to plug off water in new Long Beach deep sand discovery; first well in program to revive production in Simi field in Ventura County is 60-barrel pumper; wildcat starts in Monterey County.

Kern County: Rothschild-Bender Oil Operations has made a gas discovery in the Salt Creek area. Operators' Sheep Springs 8 in 17-29s-21e flowed at a rate of 20 million cubic feet daily on a 3-hour production test of a 25-foot interval in the Oceanic zone. Some condensate was recovered. Shut-in pressure is 2200 pounds. The operators will whipstock Anderson 4, 600 feet south, over to this zone. The latter well originally tested wet in the Oceanic.

About 1000 feet southeast of the discovery, Independent Exploration Company's Cymric 11 has made an oil discovery in the Oceanic zone. Four ½-inch holes were shot at 4790 and a subsequent recovery was 150 feet of muddy oil with a gallon of 36-gravity oil on top. Results from these wells, within a 500-foot radius, are indicative of the complicated geology of the area. The Rothschild-Bender well and the Independent well are the only ones in the Salt Creek area to find the Oceanic pay.

Two miles southwest, in the Temblor area, Cal Oil and Gas Company has located a wildcat in 30-29s-21e.

Two other wildcats are scheduled for

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early spud in the county. In the Shark Tooth area, Barnsdall Oil Company has located S.P. 1 in 23-28s-28e, and in the southern part of the county in the well-prospected San Emigdio area, Continental Oil Company was preparing to drill Kern County Land Company M-1, 27-11n-22w.

Los Angeles County: Outcome of Shell Oil Company's attempt to plug off water in Dolley 2, new deep sand discovery on the southeast side of the Long Beach field should be known in a few days. Shell has not made official acknowledgment of the discovery, but a good producer seems assured in view of the 2000 pounds bottom-hole pressure. The well produced about 400 barrels of oil and 600 barrels of water before it was killed.

Seaboard Oil Company is releasing no information about its schist test, Johnson 1 in the Lawndale area, 17-3s-14w. Scouts estimate the depth at about 8000 feet and indications are the well is close to its objective. A second schist test, R. W. Jerman's Torrance 1 in the Torrance field, 14-4s-14w, was abandoned when a test of 290 feet of schist formation recovered only mud and water. Total depth was 5796 feet.

The Texas Company has located Malis 1, wildcat about 1 mile north of the east end of the Del Valle field in 10-4n-17w.

Santa Barbara County: Union Oil Company will drill a wildcat 2 miles east of the Gato Ridge field. Location has been staked for Giorgi in 12-8n-32w. This is about ½ miles north of the dry hole drilled by General Petroleum Corporation 5 years ago and abandoned at 1255 feet in Franciscan Basalt.

Ventura County: Union's first well in its program to revive heavy oil production in the Canada de la Brea rea of the Simi field has turned out fav rably. Canada de la Brea 4 has been completed on the pump for 60 barrels of 16.4-gravity oil from redrilled depth of 1820 feet. Production is from the Sespe, whereas in the main part of the field to the east the oil is obtained from strata of Eocene age.

Union also has completed Henderson 1 in the West Mountain field for 80 barrels on the pump. The well extends production in this area a short distance to the east.

Monterey County: North American Oil Consolidated and Jergins Oil Company will drill a joint test near the W¼ corner of 35-22s-10e, about 3 miles southeast of San Ardo. It is reported the well will be drilled to basement. Prospecting has been carried on in the county for many years without a discovery, despite many encouraging showings. Five dusters were drilled last year.

Fresno County: Porter, Sesnon et al will drill Chevalier 1, a wildcat, in 12-21s-14e about 1 mile south of the West Coalinga field.

Seaboard Oil Company's closely watched test for Cretaceous production, Lillis 85 in 36-15s-12e, was coring at 5400 feet. A discovery in the Cretaceous in California would initiate a surge of prospecting to rocks of this age.

Tax Collections Up

Mississippi severance tax collections for May reached an all-time high, according to the State Tax Commission. Total collections were $283,430.43, which represented the tax on the sale of 2,858,690 barrels of oil and condensate.

• Rocky Mountain Area

Wyoming's Seven Mile Dome Wildcat Logs Shows of Oil

Additional shows of oil logged by Seven Mile Dome wildcat, Wyoming; good gas volumes reported from tests of Church Buttes prospect; Carter's Great Divide Basin wildcat abandoned; important discovery made in Northwest Elk Basin area, Montana; North Craig, Colorado, wildcat has oil show.

Wyoming

Additional shows of oil have been encountered by The California Company and Phillips Petroleum Company wildcat on the Seven Mile Dome at Christiana 1, NE NE SE 8-17n-77w, Albany County. The well topped the Morrison formation at 6005 feet and has been coring in sand below 6126 feet. Cores below 5975 feet have shown some saturation and may carry water. This sand will be tested before the well is deepened to the Sundance, expected within the next 300 feet. This well developed oil on a drill-stem test of the Muddy formation and on a test at 5821-33 feet it made 940 feet of oil in 30 minutes, indicating the zone to be commercial. Tests of the Dakota and Lakota sands showed some water with the oil.

Uinta and Sweetwater Counties: It was reported without confirmation that Mountain Fuel Supply Company of Rock Springs, Wyo., has made tests of its second well on the Church Buttes structure and that gas volumes will exceed those from the discovery, 5 miles south. The well is Unit 2 NE NE NE 22-17n-112w, now at 12,692 feet, total depth, in the Dakota. Top of the sand was unofficially reported at 12,440 feet and 7-inch casing has been set at 12,445 feet. Operator has released no formation tops or tests, but the reported volume produced on recent tests was in excess of 45 million cubic feet daily. The discovery had an official gauge of 35 million cubic feet with approximately 300 barrels of 50-gravity condensate daily. Unit 3, NE SW NE 12-16n-113w, 6 miles southwest of No. 2, was still at 12,960 feet, total depth, milling on a core barrel lost in the hole. Seven-inch casing was run to 12,944 feet, and operator reported a gas flow at the rate of 12,800,000 cubic feet on test of the upper 7 feet of sand. These operations are the deepest in the Rocky Mountain region, and total cost for the 3 wells is estimated in excess of $1 million. Union Pacific Railroad Company is partner with Mountain Fuel in the unit.

The Carter Oil Company's Great Divide Basin wildcat at Government 1, C NE NE 13-26n-93w, has been abandoned at 8551 feet, total depth, with Steele shale reported topped at 8215 feet. No other formation tops have been released by Carter on the well, and no drill-stem tests were taken. There was considerable coring on the well and those sands encountered were reported as hard and tight, with no shows. This well is 10 miles south of the Crooks Gap field and 15 miles west of Lost Soldier field.

Fremont County: Continental Oil Company and General Petroleum Corporation were moving in rotary for a wildcat at Unit 1, NW SW SE 26-27n-93w, on the East Antelope structure. This well will check upper Cretaceous sands at approximately 6500 feet and may be deepened to the Dakota at approximately 10,000 feet, depending on structural condition reflected by Upper Cretaceous markers. This test is 5 miles east of a General Petroleum Corporation failure at Antelope. The Antelope well went to 10,776 feet, total depth, in the Sundance and found only small shows of gas in the Frontier, Dakota and Lakota sands.

Montana

An important discovery has been made in the Northwest Elk Basin area by Sinclair Wyoming Oil Company at Wilkins 1, NW SW NW 28-9s-23e, Carbon County. The well gauged more than 5 million cubic feet of gas in the Tensleep, topped at 5912 feet. The operation is being carried on to the Madison, approximately 800 feet deeper. This wildcat is a mile northwest of production in the Elk Basin field, and is separated from the field proper by a series of faults. Elk Basin is the largest producing field in Wyoming and makes approximately 17,500 barrels of 31-gravity oil daily from the Tensleep. Last winter Stanolind Oil & Gas Company, Elk Basin unit operator, discovered oil in the Madison formation and is now deepening a second well to that formation. The Northwest Elk Basin test made 315 feet of oil on drill-stem test of the Frontier at 3425-76 feet, and tested 3½ million cubic feet of sweet gas on 40-minute test of the Dakota at 4382 feet.

Colorado

Another show of oil has been encountered in Carter's wildcat at Unit 1, C SE SE 30-8n-90w, Moffat County, on the North Craig structure. On drill-stem test at 7942-50 feet the well made gas in 2 minutes and recovered 30 feet of oil- and gas-cut mud. Operator was coring ahead below 7957 feet. Mesaverde was topped at 5286 feet. A week earlier the well made 285 feet of fluid, of which 50 percent was oil with the balance drilling mud, in 1 hour.

• Canada

Fifth Success Assured for No. 5 Well in Leduc Field

Imperial Oil, Ltd., has been assured of a fifth success at its fifth start in the Leduc oil field, discovered by this company in February. The latest success, imperial-Leduc 5, lsd 8 21-50-26w4th, has obtained production in a Devonian section which was too tight at the first 4 wells to yield commercially, further emphasizing the variable nature of porosity in the field.

In a 1-hour drill-stem test through 4½-inch pipe at 4975-5020 feet, No. 5 started making gas at 304 Mcf daily rate, flow dropping to zero as fluid entered the pipe. When the stem was pulled, a 3300-foot column of light crude was recovered. The crew was preparing to core on from 5020 feet with a short distance to go to reach the level from which Imperial No. 1 is producing, ¼ mile to the east.

The well-developed porosity at No. 5 compares with the section from about 4975 to 5029 feet at No. 1, which showed oil-saturation, but where porosity was too poorly developed to yield, at least without acid. No. 1 broke into excellent porosity from 5029 to 5066 feet, where drilling was completed.

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■ Lumber for Sale 3 x 6 and wider 10 to 16 rough oak $58.00. E. J. Gaiennie Lumber, Box 1074, Shreveport, Louisiana.

For Sale at Fort Worth: 3,000 ft. new 2½" heavy drill pipe, plain ends. Reply Drawer 1600, Fort Worth.

HELP WANTED

■ Well-established, expanding geophysical company offers openings for thoroughly experienced central office interpreters, field seismograph party chiefs, computers, observers and surveyors. Excellent salaries and opportunities for advancement. Please state in first letter type of position expected, education, age, experience, salary expected and date available. Address: Box 66, c/o World Oil, Houston, Texas.

■ Development Geologists. Under 35. Gulf Coast. Excellent employer. Around $300 per month to start. No fees. Oil Industry Employment Service, 319 Castle Bldg., Phone 4-5974, Tulsa, Okla.

Wanted, assistant professor of petroleum engineering. Training should include experience with well equipment, construction, strength of materials, and laboratory testing. Address reply to Box 67, c/o World Oil, Houston, Texas.

WANTED—Proration Engineer and Co-ordinator of matters pertaining to state regulatory bodies by major company operating in Mid-Continent area and Southwest. Please reply giving all information and particulars. Prompt interview will be arranged. Box 72, c/o World Oil, Houston, Texas.

FOR SALE

3-100 H.P. OIL FIELD BOILERS
COMPLETE WITH STACKS

Built by — Broderick Locomotive Company

Boiler Size Over All	21' 3"
Diameter	5' 0"
Fire Box	4' 5" x 6' 8"
Smoke Box	2' 3"
Flues	98-3"
Stop and Check Valve	4" - 600 #
Safety Valve "Tex Steam"	2"
Check Valves "Crane"	2" - 600 #
Working Pressure	275 #

Stay Bolts and Flues in Good Condition

Hydrostatic Test Applies to 300 # — May 5, 1947.

Subject to Prior Sale

These Boilers Have Been Used

LEVINGSTON SHIPBUILDING CO.
P. O. Box 411 Phone 521
ORANGE, TEXAS.

WANTED TO BUY

DRILL PIPE WANTED. Submit us what you have—any size and in any condition. Will pay fair price for any lot, including pipe not fit to run, and even junk pipe. The Clay Brothers Drilling Company, Inc., 1804 Fair Building, Fort Worth 2, Texas.

Is Your Company For Sale?

Wanted to buy small local manufacturing company which supplies equipment to petroleum industry. Desirable that company's products and manufacturing ability are already proved. Buyer not interested in inventions or new developments not in production. Write us giving type of product you manufacture, plant size and general location and approximate asking price. Box 74, c/o World Oil, Houston, Texas.

HELP WANTED

WANTED: Superintendent for gulf coast. One who has had experience both in drilling and producing oil and gas wells. Excellent opportunity with good sized independent company. Box 73, c/o World Oil, Houston, Texas.

ENGINEERS — Stanolind Oil and Gas Company, P. O. Box 591, Tulsa, Oklahoma, has opening for graduate chemical or mechanical engineer with two or more years experience in gasoline or recycling operations.

LEASES, DRILLING, ACREAGE, ETC.

■ SEE A. L. BOWLES, ADA, OKLAHOMA, FOR SHALLOW DRILLING DEALS IN OKLAHOMA.

READ
The Trading Post
FOR SALES
AND SERVICES

EXPLORATORY FAILURES

ALABAMA WILDCATS

Choctaw County: Daryl Davis' S. H. Bolinger & Co. 1, ne se 15-11n-3w, Chalk 2157, Eutaw 3254, L. Tuscaloosa 4622, Massive sand 4788, abnd 7-2-47 at 4841.

Marengo County: George Ballio's J. L. Bedsole 1, sec 18-13n-1e, Chalk 1040, Eutaw 2015, Tuscaloosa 2486, Massive sd 3268, abnd 6-25-47 at 3399.

CALIFORNIA WILDCATS

Kern County: Independent Exploration Co. Oceanic Oil Co.'s Roco 3, 18-29s-21e, Cymric area, abnd 4-15-47 at 2315.

Richfield Oil Corp.'s Belridge B 2, 21-27s-20e, N. Belridge area, abnd 6-27-47 at 8896.

Wilshire Oil Co.'s McKittrick 3, 12-30s-21e, McKittrick area, abnd 7-2-47 at 3456.

Fresno County: Cantua Creek Oil Co.'s S. P. 1, 3-17s-15e, Cantua Creek area, abnd 6-30-47 at 6552.

Orange County: Morton and Sons' Irvine 55-1, Block 55 Irvine sbdn, Corona Del Mar area, abnd 6-26-47 at 9427.

Ventura County: Jahn's Oil Co.'s Goodenough 1, 18-4n-19w, Fillmore area, abnd 6-20-47 at 2210.

ILLINOIS WILDCATS

Clinton County: Superior's Martin 1, ne sw 14-3n-5e, abnd 3038.

Cumberland County: M. H. Richardson's Cobble 1, se nw nw 4-10n-10e, abnd 875.

Franklin County: W. I. Lewis' Neuf 1, ne se 29-5s-2e, abnd 2730.

Hamilton County: Calvert & Willis' Leathers 1, nw sw ne 2-6s-5e, abnd 3465.

Perry County: Collins Brothers' Waldman 1, se ne nw 7-4s-1w, abnd 1355.

Richland County: A. J. Slagter, Jr.'s Couch 1, nw nw ne 26-2n-14w, abnd 3042.

Wayne County: E. T. Robinson's Woods 1, sw se sw 23-2s-5e, abnd 3348.

INDIANA WILDCATS

Fountain County: Aldridge & Banta's Bodine 1, ne nw 16-19n-8w, abnd 2428.

Gibson County: Sam Malis' Fleener 1, ne sw sw 22-3s-12w, abnd 2735.

Knox County: P. F. Goldburg's Wharf 1, Don 52-3n-9w, abnd 1588.

Martin County: Hoosier Pipeline Corp.'s Walton 1, ne sw sw 8-3n-4w, abnd 414.

Pike County: Ralph Halbart et al's Coal 1, ne nw se 12-3s-8w, abnd 1477.

Posey County: B. M. Heath et al's Stallings 1, sw nw sw 13-5s-13w, abnd 2993.

Vic & Van Op. Co. et al's Wargel 1, se se ne 25-6s-12w, abnd 2727.

Sullivan County: Roy Myers' Failing 1, se sw 19-9n-10w, abnd 640.

KENTUCKY WILDCATS

Daviess County: F. H. Rhoades et al's Nation 1, 2-N-28, abnd 1940.

Henderson County: Ashland O&R Co. et al's Farmer 1, 13-P-23, abnd 2645.

J. L. Kennard et al's Minerals 1, ne sw nw 18-Q-25, abnd 2324.

McLean County: Illey Browning's Allen 1, 4-M-25, abnd 2628.

KANSAS WILDCATS

Barton County: Three-Way Drlg. Co.'s DeWald 1, se ne ne 13-16s-15w, abnd 3504.

Butler County: Ralph Wixon's Adamson 1, se se nw 4-25s-4e, abnd 3169.

Ellsworth County: M. M. Price et al's Novotny 1, cs½ sw ne 32-16s-10w, abnd 3396.

Graham County: Nate Appleman's Hibbitts 1, sw sw sw 12-7s-21w, abnd 3672½.

Marion County: M. & L. Drlg. Co.'s Melcher 1, nec 12-19s-4e, abnd 2998.

McPherson County: H. A. Burt's Voth 1, se nw ne 7-17s-1w, abnd 2733.

Phillips' Holcomb 1, se ne sw 28-17s-1w, abnd 3330.

Pawnee County: Kiowa Oil Co.'s Russell 1, nec 10-23s-16w, abnd 4185.

Phillips County: Tom Palmer's Boethin 1, sw se nw 12-4s-20w, abnd 3646.

Pratt County: Plains Exploration Co.'s Shearer 1, swc 17-29s-12w, abnd 4733.

Saline County: H. H. Meyer's Stauffer 1, c n½ ne ne 1-14s-2w, abnd 3408.

Stafford County: Three-Way Drlg. Co.'s Lamb 1, ne ne se 20-23s-11w, abnd 3850.

Thomas County: Texas Co.'s Meeks 1, se se sw 36-8s-31w, abnd 4942.

Cowley County: Continental's Kropp 1, nw nw sw 26-30s-3e, abnd 3423.

B. C. Hyde's Mueller 1, nwc sw 36-33s-4e, abnd 3071.

Mid-Plains Prod. Co.'s Shaver 1, nw sw sw 7-33s-8e, abnd 2917.

Wakefield & Kanotex' Goatley 1, cw½ sw ne 5-35s-5e, abnd 3040.

Marion County: Lion Oil Co. et al's Penner 1, swc ne 17-20s-2e, abnd 3200.

Rooks County: Cities Service's Beisner 1, swc 25-9s-16w, abnd 3609.

Westgate-Greenland's Henderson 1, se se nw 23-9s-18w, abnd 3700.

Sunray's Choquette 1, ne ne se 13-9s-20w, abnd 3630.

Stafford County: Stanolind's Moses 1, se se sw 17-22s-13w, abnd 3900.

Alpine Oil Co.'s Hill 1, nw nw ne 11-23s-12w, abnd 3710.

NORTH LOUISIANA WILDCATS

Madison Parish: Stanolind's E. Sondeheimer 1, 638 fr sl 1669 fr el 19-18n-12e, abnd 6-20-47 at 4069.

Natchitoches Parish: Texas Co.'s J. I. Freedman 1, 2150 fr el 500 fr nl 1-7n-7w, core test, abnd 6-24-47 at 1402.

Texas Co.'s Zorada Jones et al 1, 1550 fr el 1510 fr nl 51-8n-6w, core test on Bermuda Prospect, abnd 6-23-47 at 1405.

Texas Co.'s Zorada Jones et al 2, 59-8n-6w, core test on Bermuda Prospect, abnd 6-22-47 at 1401.

Richland Parish: Mitchell & Anderson's Myrick & Tisdale 1, sec 12-17n-5e, Gas Rock 2338, Tuscaloosa 2372, Massive sand 3199, abnd 6-28-47 at 3814.

Paul E. Parsons' Brooks-McKibben 1, c se ne se 8-17n-9e, 1½ mi n Delhi prod, base Clayton 3130, Glenrose 3138, abnd 6-24-47 at 3502.

Union Parish: T. L. James & Co.'s E. H. Miller 1, 1005 fr sl 3453 fr wl 36-23n-2w, Cotton Valley 6005, Bodcaw 6414-31, abnd 6-23-47 at 6923.

SOUTH LOUISIANA WILDCATS

Jeff Davis Parish: Stanolind's Houssiere-Latreille 1, ne¼ 9-10s-3e, 1½ mi nw of S. Jennings prod, abnd 7-7-47 at 12,006.

St. Mary Parish: Humble's Humble-Cote Blanche-J. M. Caffery Fee 2, 10-15s-7e, abnd 7-5-47 at 15,140.

Vernon Parish: Humble's Anderson - Post Hardwood Lbr. Co. et al 1, 11-2n-11w, 22 mi n Neale prod in Beauregard Parish, abnd 7-1-47 at 12,159.

MICHIGAN WILDCATS

Arenac County: Ervin Major's Dunec 1, se se se 32-19n-3e, Dundee 2990, abnd 7-5-47 at 3064.

Monroe County: F. T. Cannon's Elconin 1, ne sw nw 1-6s-9e, abnd 7-1-47 at 1925.

Montcalm County: Leslie T. Barber's Thompson 1, sw ne nw 20-11n-7w, abnd 6-30-47 at 1197.

Oceana County: Rowmor Corp.'s Weber 1, se sw ne 8-13n-18w, Traverse 1616, abnd 7-3-47 at 1649.

MISSISSIPPI WILDCATS

Marion County: S. W. Richardson's Pearl Randall 1, se se 18-5n-17w, Wilcox 3217, Tuscaloosa 8782, Massive sd 10,086, abnd 6-28-47 at 10,154.

Rankin County: Lion's W. G. Sowell 1, sw se 7-5n-5e, Eutaw 6090, Tuscaloosa 6635, L. Tuscaloosa 7465, Comanchean 7660, abnd 7-3-47 at 7808.

OHIO WILDCAT

Muskingum County: John Morrow et al's Sidney Courtney 1, sw se 24 Newton, Medina 3793-3801, abnd 6-22-47 at 3808.

OKLAHOMA WILDCATS

Carter County: Wirt Franklin's Frensley 1, nw sw nw 10-5s-2w, abnd 5517.

Cotton County: Mid-Continent's Bull 1, ne ne nw 29-2s-9w, abnd 2588.

M. M. Massad's Harper 1, sw se sw 5-4s-9w, abnd 2009.

J. W. Baldwin's Sarge 1-B, nw ne 18-4s-10w, abnd 1510.

Hughes County: Kingery & Patterson's Bilby 1-A, nw nw ne 6-6n-9e, abnd 2835.

Kiowa County: J. P. Morgan's Biler 1, ne ne se 33-2n-16w, abnd 840.

Lincoln County: Westgate - Greenland's Strough 1, ne ne ne 28-15n-5e, abnd 3416.

Texola Drlg. Co.'s Tillieson 1, nw se nw 22-15n-6e, abnd 4273.

Logan County: Smith-Horton Drlg. Co.'s Anderson 1, ne ne se 14-18n-3w, abnd 6142.

Okfuskee County: B. C. Deardorf's Getner 1, sw se sw 19-13n-8e, abnd 4159.

Tillman County: A. C. Bray's Koss 1, c se se nw 15-1s-15w, abnd 760.

A. E. Blair's Wolf 1, nw sw sw 34-4s-16w, abnd 1820.

WEST TEXAS WILDCATS

Ector County: Cities Service-Sinclair Prairie's Wooten 1, c ne ne PSL 12, blk B-14, elev 2909, Yates 2610, base Permian 7890, Strawn 7990, Woodford shale 8110, abnd 7-7-47 at 8335.

Hockley County: Stanolind's E. Gilmer Howard 1, 660 out nec labor 23, lge 720, State Capitol Lands, elev 3560, San Andres 3770, abnd 7-5-47 at 4900.

Scurry County: Humble's Harrell 1, c ne ne H&TC Ry. 78, blk 2, elev 2288, Ellenburger 7430, abnd 7-6-47 at 7563.

NORTH CENTRAL TEXAS WILDCATS

Jones County: Eastland Oil Company's Foster 1, 277 nsl 330 wel nw¼ sect 24, D&DA sur, elev 1557, abnd 6-28-47 at 3390.

Wm. Herbert Hunt Tr. Est.'s Camp 2, 660 wel 9900 nsl S. M. Hale sur 251, elev 1679, abnd 6-26-47 at 3055.

Trinity-Martex et al's Carter 1, 1300 ewl 990 nsl n½ T&P Ry. 32, blk 18, elev 1845, Swastika sand 3076, abnd 6-25-47 at 3112.

Shackelford County: L. & G. Oil & Royalty Co.'s DeLafosse 1, 467 out nwc T&P Ry. 9, blk 8, Palo Pinto 1740, abnd 6-26-47 at 4462.

Taylor County: Ungren-Frazier et al's Sealy-Smith 1, 330 out swc labor 1, lge 146, Grimes CSL, elev 1828, abnd 6-27-47 at 3012.

NORTH TEXAS WILDCATS

Archer County: E. B. Clark et al's Lyles 1, 1250 wel 2650 nsl sec 7, Hooper & Wade sur, Strawn 3525, abnd 6-24-47 at 3781.

C. G. Butts et al's Calvin 1, 450 nsl 750 ewl W. K. Keen sur, abnd 6-24-47 at 1203.

C. G. Butts et al's Graham 1, 700 snl 750 wel E. M. Hardin sur, abnd 6-24-47 at 1200.

W. J. Grisham et al's Campbell 1, 150 n 150 w of nec sect 1812, TE&L Co. sur, but in J. Tomlinson sur, abnd 6-1-47 at 1107.

Paul B. Scott et al's Hyer 1, 750 snl 150 ewl e½ J. Ruddle sur, abnd 6-20-47 at 1073.

Clay County: Sussex Oil Co's Thos. Ryan 2, 453 wel 753 nsl blk 11, Byers sbdn, abnd 6-26-47 at 1185.

Foard County: Magonlia's Bell 1, 3200 ewl 1320 snl Abram Frisby sur, elev 1396, Wichita-Albany 800, Canyon lime 3600, Canyon reef 3740, Mississippi 5530, Ellenburger 5815, abnd 7-5-47 at 5820.

Wichita County: J. G. Fowler et al's Kasper 1, 1950 snl 450 ewl TE&L Co. 827, elev 1112, abnd 6-22-47 at 2101.

EAST CENTRAL TEXAS WILDCATS

Kaufman County: Humble's Guy 1, 6150 wel 2450 snl J. S. Ables sur, elev 402, Austin chalk 2019-2610, Woodbine 2990, Georgetown 3550, Paluxy 4489, Glen Rose 4714, massive anhydrite 5530-5653, Pettit 6172, Travis Peak 6254, Cotton Valley 7545, Buckner 8957, Smackover 9477, abnd 7-6-47 at 9800.

SOUTH CENTRAL TEXAS WILDCAT

Milam County: W. F. Glen's E. H. O'Neal 2, 1330 fr swl 330 fr nwl 41.72-ac lse, Jose Leal sur, abnd 6-22-47 at 1438.

SOUTHWEST TEXAS - LOWER COAST WILDCATS

Duval County: Huff & Klaeger's Driscoll Est. 1, 1400 fr sl 4700 fr el 1120-ac lse, 1400 fr sl 1550 fr wl J. Poitevent sur, 328, abnd 6-25-47 at 4005.

Jim Wells County: Radcliffe Killam's Wade 2, 500 fr nwl 2480 fr sly/nel J. M. Alorete Gr. 843.7-ac lse, abnd 6-24-47 at 5203.

Starr County: Baldridge & King's Yturria Ld. & Livestock Co. 2-A, 330 e of wl e½ Porc 100, abnd 6-22-47 at 4277.

T. B. Hoffer et al's Starr Co. Cattle Co. 1, 330 fr n&el lot 37, sbdn n 3000-ac sh 60-0, Porc 88&89, 800 e se small gas well in lot 37, Barbacoas area, abnd 6-24-47 at 5516.

Webb County: Texas Co.'s T. Vasquez 2, 330 fr nl 1320 fr el Teodora Vasquez sur, 418.9-ac lse, abnd 6-28-47 at 1808.

SOUTHWEST TEXAS - LOWER COAST OUTPOSTS

Nueces County—N. King: Jack Little, Tr.-Selby-Walker Corp.'s Alfred Koenig 1, 475 n 330 3 fr nw interior cor 400-ac lse, Casa Blanca Gr. 2550 fr prod, abnd 6-15-47 at 5600.

Webb County—Hughes: O. W. Killam's J. G. Garcia Hrs. 1, 220 fr sl 120 fr wl blk 7, sur 607, 260-ac lse, 4650 sw Killam & Hurd's Garcia 2, abnd 6-24-47 at 3946.

MIDDLE TEXAS COAST WILDCATS

Bee County: Stanolind's Stella W. Russell 1, 330 fr n&el J. P. Smith sur, 220.5-ac lse, abnd 6-26-47 at 7515.

Wm. M. Nicholls' Asa A. Jones 1, 330 fr nw&swl 113-ac lse, D. B. Turner sur, abnd 6-28-47 at 4500.

Jackson County: Phil Harris & Alice Faye's A. Michalek 1, 330 fr nel 990 fr nwl sect 9, 160-ac lse, C. W. Hahl sbnd Harwood & Burns rch, abnd 6-29-47 at 5090.

UPPER TEXAS COAST WILDCAT

Liberty County: William Hells' Mrs. Jane Gonterman et al 1, 2342.3 s of nl 4197.5 e of wl Neville sur, 1¼ mi w of old Cottonwood disc prod, abnd 6-25-47 at 8133.

WYOMING WILDCAT

Sweetwater County: Carter's Gov't. 1, c ne ne 13-26n-93w, Great Divide Unit, Steele Formation 8215, abnd 7-1-47 at 8551.

L. H. Prichard

Roland V. Rodman

Roland V. Rodman has been named president and a director of Anderson-Prichard Oil Corporation and **L. H. Prichard,** the former president, has been elected chairman of the board and will continue as a director. Rodman, 50, a native of Nebraska, practiced law for 18 years after his graduation from the University of Nebraska and joined The Bay Petroleum Corporation as general counsel in 1937. He was made vice president and general manager in 1939 and was elected president in 1946. Prichard has been president of Anderson-Prichard since the firm's organization in 1922.

»

Amon G. Carter, Fort Worth publisher and oil producer, has transferred his extensive West Texas oil holdings to the Amon G. Carter Foundation. He discovered deep oil zones in the Wasson field and is co-discoverer of pre-Permian oil zones in the Keystone field.

»

Joe W. Pyron, West Texas district pipe line foreman for the Gulf Refining Company, pipe line division, has been transferred from Odessa to Shreveport, where he becomes assistant superintendent of the Louisiana division. He is succeeded at Odessa by Jewell J. Thorp, formerly chief gauger for the Odessa district. **R. R. Mitchell** was promoted to chief gauger.

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AUSTIN, TEXAS

L. W. Elliott, president of Standard-Vacuum Oil Company, became a brigadier general in the Officers' Reserve Corps with the Senate confirming the promotion. Elliott, a staff officer with General MacArthur in the last war, and eight other colonels had been recommended for the promotion by President Truman. The nine men are the first reserve officers who did not serve as general officers during the war to attain this rank in the ORC. Elliott was a private in World War 1 and served 16 months in France. He began his career in the petroleum industry with The Carter Oil Company while attending Tulsa University.

L. W. Elliott

»

William L. Hobro, Shell Oil Company engineer, has been elected chairman of the Conservation Committee of California Oil Producers. Other officers elected are: **R. A. Holman,** Amerada Petroleum Corporation, secretary; **T. H. Sherman,** Huntington State Company, first vice chairman; and **H. S. Stark,** Honolulu, second vice chairman.

»

Joseph T. Wilson, Jr., was named manager of the general accounting department of Sun Oil Company. **William F. Yorty** was chosen manager of a new transportation accounting division designed to speed movement of petroleum from production areas to refineries and ultimately to the consumer. Wilson joined Sun Oil in 1941 as an auditor. The following year he was appointed staff assistant in the accounting department. In 1943 he was named first assistant in general accounting. Yorty joined Sun Oil in 1922. Prior to his present appointment he had been serving as first assistant in the Sun Oil Company bookkeeping department.

»

Jack F. Knight has been named manager of sales development for Reed Roller Bit Company, Houston. He will have charge of all promotional activities, both within the sales organization and among customers. After graduating from the University of Texas, Knight joined Reed in the shipping department. He was advanced to field warehouseman, then to territorial salesman. Later he was assigned to supervisory control of finished goods and then to production manager. In 1945 he became assistant sales manager under **R. G. Hamaker,** vice president in charge of sales, who continues to direct all sales activities.

Jack F. Knight

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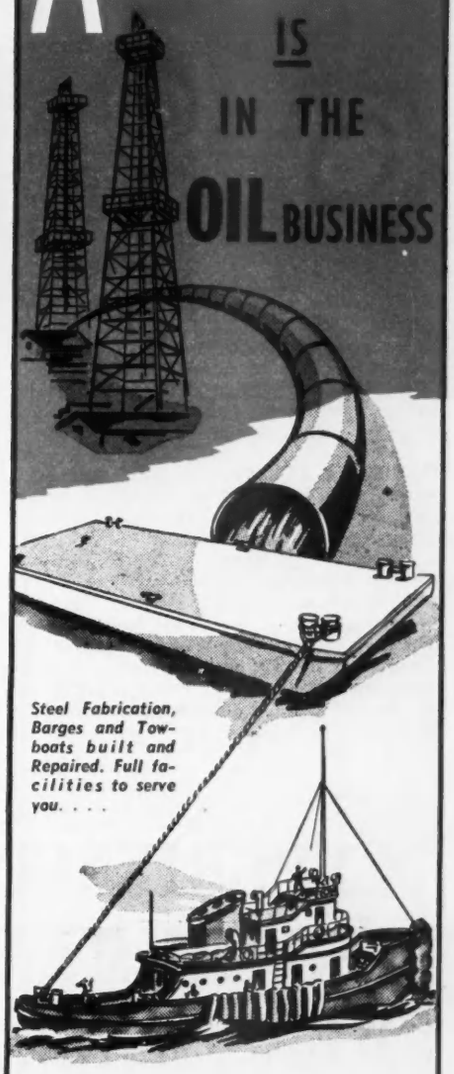
IS

IN THE

OIL BUSINESS



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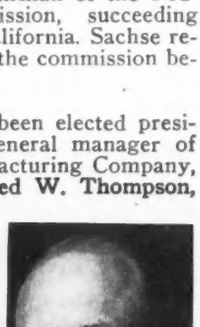
Harold C. Anderson has been named vice president of research engineering and development for Thermoid Company. Anderson joined Thermoid in 1945, taking charge of development phases of the company's new rubber program. In 1946 he assumed direction of all company research engineering and development. Before joining Thermoid he was associated with Flintkote Company as assistant general manager for industrial products. Previously, he had held important positions with the Chrysler and Ford organizations.

Harold C. Anderson

Col. A. E. (Cappy) Higgins has been named vice president of Rockwell International Corporation, New York City. Col. Higgins retired from the army after a distinguished career. Prior to the war he had been associated with the Rockwell organization from 1937 to 1942. As vice president of Rockwell International he will maintain his headquarters in the Empire State Building. He will have responsibilities in the export marketing of products of the various Rockwell divisions.

Harrington Wimberly of Oklahoma has been elected vice chairman of the Federal Power Commission, succeeding **Richard Sachse** of California. Sachse recently resigned from the commission because of ill health.

Oliver F. Gang has been elected president, director and general manager of Ludlow Valve Manufacturing Company, Inc., succeeding **Alfred W. Thompson,** who has become chairman of the executive committee and continues as treasurer. Gang went to Ludlow from William Powell Company of Cincinnati and New York, which he served as vice president and consulting engineer. During World War II, he was a member of the valve and fittings industry advisory committee of the War Production Board. He is a former vice president and director of the Valve Manufacturers Association.



Oliver F. Gang

Gus Baker has been named sales manager for Frank Wheatley Pump & Valve Manufacturers, Tulsa. Baker has been with Wheatley for 15 years.

M. W. (Monk) Cook has been appointed Near East sales and service representative for Security Engineering Company, Inc., International Derrick and Equipment Company, Byron Jackson Company, Chiksan Export Company, Patterson-Ballagh and Falcon Products.

Deaths

E. G. McKeever, president of Pan American Petroleum and Transport Company died July 9 in New York City. He had succeeded **Dr. Robert E. Wilson** as head of Pan American on January 1, 1945. McKeever began his career with Pan American in 1915 and was named executive vice president in 1937 after holding many positions of responsibility.

E. G. McKeever

James Bracewell of Tulsa, special investigator for the Great Lakes Pipe Line Company, died July 8.

Emmett L. Wilkerson, 65, assistant general counsel for the Magnolia Petroleum Company and an employe for 26 years, was fatally wounded by a self-inflicted pistol shot July 8 in the company's Dallas office.

B. A. (Mike) Adams, 40, construction engineer in the East Texas field, died July 1 at Kilgore of injuries suffered when he was slugged and robbed by an unknown assailant.

Guy T. Berry, 77, independent oil producer died July 4 at Independence, where he had lived 30 years. He was a director of IPAA and in 1941 was designated the "Grand Old Man of Production" by the International Petroleum Exposition. He also had held directorships in the Mid-Continent Oil & Gas Association, the National Stripper Well Association, and the Kansas Independent Oil & Gas Association.

Mrs. Ida Mayfield Balch, 69, retired personnel director for Sinclair Prairie Oil Company, Tulsa, died July 6 in Tulsa. She had lived in Tulsa since 1917 and had been with Sinclair Prairie from 1920 until her retirement in 1940.

Clarence E. Tabor, 53, general manager and a director of the C. L. McMahon Oil Company, Inc., Tulsa, was killed July 6 in an automobile accident near Atoka, Okla., while en route to Tulsa from Tyler, Texas. He was the third top executive of the oil company to die within a year. Tabor moved from Tyler to Tulsa several years ago.

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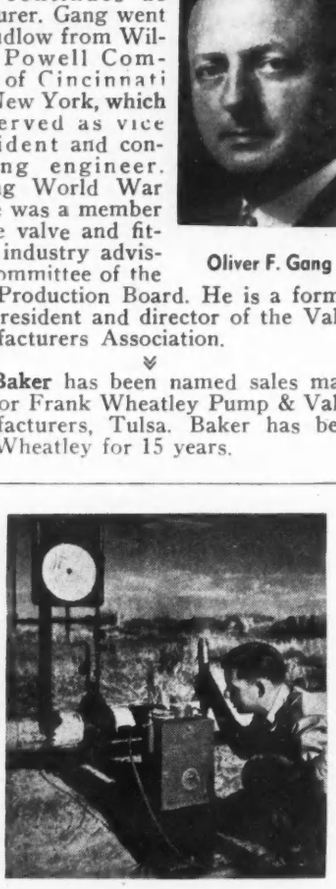

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O. E. Murrey Succeeds Stanley at Midwestern Engine and Equipment

O. E. (Ted) Murrey has been named president of Midwestern Engine & Equipment Company, Tulsa, succeeding F. E. Stanley.

O. E. Murrey

Armon H. Bost was named vice president and general manager; G. O. Glandon, vice president and secretary-treasurer; and Joe Hair, assistant secretary-treasurer. Stanley resigned to devote full time to the operation of Midwestern Constructors, Inc., of which he is president, and to other interests.

Murrey served for seven years as sales manager for the pipe line department of Cardwell Manufacturing Company before joining Midwestern. He will continue as Midwestern's sales manager.

Cummins Director Is Elected; Other Appointments Announced

R. E. Huthsteiner, vice president and general manager of Cummins Engine Company, Columbus, Ind., was elected a director of the company to succeed the late Hugh T. Miller.

Edwin G. Crouch was named secretary, succeeding the late D. C. Bottorff. Waldo M. Harrison was named treasurer, succeeding Bottorff. Harrison also will continue as controller.

H. L. Knudsen, vice president of engineering, has resigned. Knudsen will continue as a director of the company and also will serve as engineering consultant on problems of design and research.

D. J. Cummins was named manager of engineering and quality, and W. J. Manning was chosen assistant controller.

Mud Engineer and Director of Research Named by Oil Base

Oil Base, Inc., Los Angeles, announced the appointment of Doyne L. Wilson as director of research, and Robert M. Edwards, mud engineer, for coastal California. Wilson goes from Visco Products Co., Inc., Houston, where he served as assistant chief chemist specializing in research, development and application of organic chemicals in the production and processing of crude oils. He will direct research and control laboratories on present and new products for Oil Base, at Los Angeles.

Edwards formerly served Baroid Sales Division as mud engineer in the Oklahoma, West Texas and Rocky Mountain areas. Prior to that he was four years with the Army Air Corps during the war. He will be stationed at the company's headquarters in Ventura, Calif.

American Iron, Machine Works Names District Representatives

W. F. (Bill) Behrhorst has been named California district representative for American Iron & Machine Works Company and Ray Meredith has been transferred to a similar position in the Kansas, eastern Colorado and Panhandle.

Ray Meredith

W. F. Behrhorst

Behrhorst has been district representative in Kansas. He will have his headquarters in Bakersfield and will handle all sales and service of American Iron products in California.

Meredith has been in charge of the Alice, Texas rental division for American Iron. Prior to joining the firm he was with The Pure Oil Company production department and Standard Oil Sales Company.

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The Appendix to the book includes eleven pages of excellent tables and a complete bibliography of magazine articles and other literature dealing with acidizing (69).

The author is a member of the A.I.M.E. and the A.P.I. and has had over fifteen years of experience in acidizing oil and gas wells. He is at present chief petroleum engineer for the Chemical Process Company.

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American Cable Division Names Salesman, Opens Warehouse

David Breith of Midland, Texas, has been named salesman engineer in West Texas, the Panhandle and New Mexico for American Cable Division of American Chain & Cable Company. He formerly was with Bethlehem Supply Company and General Wells Service.

David Breith

American Cable has just completed and is now stocking a warehouse at Odessa, Texas. It will be supervised by W. B. Lewis and will carry a stock of American Chain & Cable wire rope.

SKF Plans $4 Million Expansion And Modernization Program

SKF Industries, Inc., has announced a two-year modernization and expansion program. The firm plans to spend more than $4 million to equip its two Philadelphia plants with machinery capable in some instances of operating from two to six times faster than standardized equipment long used in the anti-friction bearing industry.

While the bulk of the expenditures will go for new machinery required in the production of anti-friction bearings, the program is aimed primarily at stepping up production of spherical roller bearings.

Purchasing Agent and Assistant Appointed by Spang-Chalfant

A. W. Baird, who has been assistant purchasing agent of The National Supply Company since 1944, has been named purchasing agent for the company's Spang-Chalfant division. Announcement of the promotion was made by H. E. Cooley, director of purchases of The National Supply Company. J. M. Taylor, who has been in the purchasing department of the company since 1945, has been appointed assistant purchasing agent of the Spang-Chalfant division. Baird started with National Supply at the Ambridge plant in 1927.

A. W. Baird

Three District Office Personnel Changes Are Announced by SKF

Three changes in personnel of district offices of SKF Industries, Inc., were announced by R. R. Zisette, general sales manager of the ball and roller bearing firm.

They include appointment of Roy C. Norton, Jr., as a field engineer in the Hartford, Conn., district office; the transfer of I. J. Torkelson, field engineer, from Chicago to the firm's branch at Milwaukee, and appointment of R. M. Parrish to the sales staff of the Portland, Ore., district office.

Norton is a native of Kittery Point, Maine, and a graduate of the University of New Hampshire. Parrish, born in Louisville, Ky., is a graduate of Oregon State College. Torkelson is a native of Madison, Wis.

Vice President in Charge of Sales Named by Joy Manufacturing Firm

E. M. Platts has been named vice president in charge of sales for Joy Manufacturing Company, Pittsburgh, it was announced by A. S. Knoizen, executive vice president. A veteran of 30 years in the mining industry, Platts was one of the principal incorporators of the La-Del Conveyor and Manufacturing Company. When La-Del became a division of Joy, he moved to the latter firm as a vice president. In his new position he will supervise the sale of all Joy Manufacturing products.

E. M. Platts

Diesel Session Set

The Diesel Engine Manufacturers Association will hold the third of its series of marine conferences in Boston, September 12. Key representatives of marine interests will be invited by the manufacturers to spend an informal day with them at the Copley Plaza Hotel, to tell their experiences with diesels and to state explicitly what their power needs are.

Texas Representative Named by Caterpillar Tractor Company

C. K. McClelland has been named a district representative in portions of Texas for Caterpillar Tractor Company, Peoria, Ill. The new representative, a graduate of the U. S. Military Academy, served from 1929 to 1946 in the Army, from which he retired with the rank of colonel. From 1940 to 1944 he was in charge of tank-automotive research and development at Aberdeen Proving Grounds and was connected with the Tank-Automotive Center in Detroit. In 1944 he transferred to the Southwest Pacific Theatre, where he served as ordnance officer at Finschafen, New Guinea, and as ordnance officer of the Philippine Base Section at Manila. He holds both the Legion of Merit and oak leaf cluster for the Legion of Merit.

C. K. McClelland

Sales Personnel Changes Made By Bethlehem Steel Company

Paul Mackall, vice president, has announced the following changes in sales personnel of Bethlehem Steel Company:

J. M. Ellis, general manager of sales, appointed assistant to vice president; K. L. Griffith, assistant general manager of sales, appointed general manager of sales; D. C. Roscoe, manager of sales, sheets and strip, appointed assistant general manager of sales; A. T. Hunt, manager of sales, galvanized sheets and formed products, appointed manager of sales, sheets and strip; M. C. Schrader, assistant to the general manager, appointed assistant to the vice president.

THAT *---!©D--X!! SERGEANT!—THAT MAN DRILLED US!!
ETHYL GAS 18¢ GAL.
Speedo
THAT REMINDS ME!—THE MANDREL ON THESE LANE-WELLS PACKERS IS BEEFED TO STAND MORE GAFF THAN THE TUBING IT'S RUN ON!!
SNAP!
LANE-WELLS
Tomorrow's

SQUEAKS from the BULL WHEEL

Now That's Settled

"What's the difference between amnesia and magnesia?"

"Well, the fellow with amnesia doesn't know where he's going next."

Playing the Percentages

"I hear you had a date with Siamese twins last night. Have fun?"

"Yes and no."

Hints for Householders

How to tell the sexes apart now that both are wearing pants: The one listening is the man.

This Curious World

Some girls grow wild in the woods.

Women like to walk down the street and see what women are wearing. Men like to walk down the street and see what women are not wearing.

The girl who claims she doesn't neck must expect to be pressed for particulars.

Longer skirts are going to bring shorter whistles.

Barely Eligible

A man appeared at the gate of a nudist colony, rang the bell and waited.

Voice (from inside): "Whatcha want?"

Man: "I want to join."

Voice: "Not with that blue suit on."

Man: "That isn't a blue suit. I'm cold."

Roughly Speaking

It was his first golf tournament.

Nervously, he addressed the ball, swung and missed.

Again he missed.

Again.

He turned and grinned sheepishly at the spectators, "Tough course, ain't it?"

Saintly Sickness

"Doc, I've been having very bad headaches."

"Humm. Been smoking too much?"

"Never touch tobacco."

"Been drinking too much?"

"Never had a drink in my life."

"What about women? Been playing around a lot?"

"Gosh, no! I haven't had a date in ten years."

"Well, my friend, my diagnosis is this: You are having headaches because your halo fits too tightly."

Family Friends

An out-of-town guest dropped in on the newlyweds.

"We haven't much room," apologized the host, "but you can sleep on my twin bed."

"Is it comfortable?"

"Derned if I know."

The Woman's Way

"Lil told me that you told her that secret I told you not to tell her."

"The mean thing! I told her not to tell you I told her."

"Well, I told her I wouldnt' tell you that she told me, so don't you tell her I did."

"Certainly not. You know I can keep a secret."

"Of course, darling."

Pardon It

"I say, old thing, could one refer to Venus de Milo as the girl who got the breaks?"

"Why not, may I awsk? It's an 'armless joke."

Turn About

A waiter who had just bought a new automobile was serving the salesman who had sold it to him.

"Hey," protested the customer. "The menu says this dinner cost $2 but you're trying to make me pay $3."

"Sure, I know. The flowers on the table account for the extra dollar."

Poet's Nook

The man who weds a fashion plate
May learn to his dismay,
That maidens fair who dress to kill
Quite often cook that way.

Encore

Women's assets are many
Each a true sensation;
But the best one she has
Is man's imagination.

Encore Some More

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He praised her figure in English,
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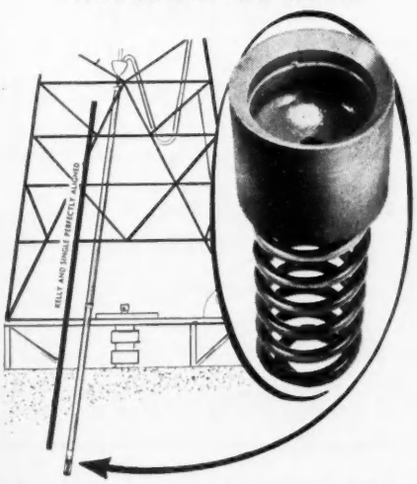

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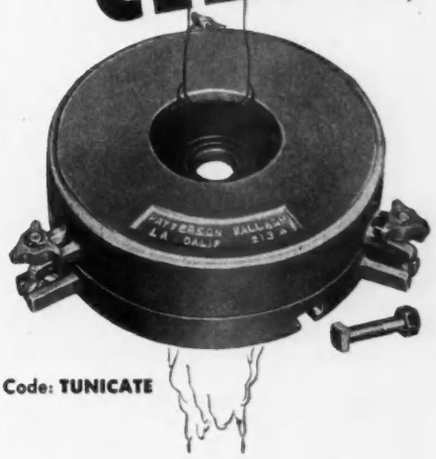

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HOUSTON

Have You Checked
The Trading Post?
Turn Back to Page 80

Skelly Plant Planned

The Skelly Oil Company will construct an absorption-type gasoline plant for the Velma district of Stephens County, Oklahoma. Contract has been awarded for design and construction to the Born Construction Company. Work is not expected to start until early next spring, with the plant to cost an estimated $1½ million. It will be the company's 14th plant, and will be designed to handle 25 million cubic feet of gas a day, with production of 50,000 gallons of gasoline.

Advertisers' Index

* The asterisk indicates that detailed information on products and services of the firm will be found in current 15th (1946-47) edition of The Composite Catalog of Oil Field and Pipe Line Equipment.

EDITORIAL INDEX, PAGE 17

*A-1 Bit & Tool Co. ---- 9
*American Iron & Machine Works Co. ---- IV Cover
*American Meter Co. ---- 84
Avondale Marine Ways, Inc. ---- 83
*Baker Oil Tools, Inc. ---- 1 and 64
Wm. M. Barret, Inc. ---- 88
Bates and Glenn ---- 88
*Bethlehem Steel Co. ---- 6
*Bowen Co. of Texas, Inc. ---- 68
J. J. Burris ---- 68
*Cameron Iron Works, Inc. ---- 11
Dan L. Clark Drilling Co. ---- 76
Climax Molybdenum Co. ---- 59
*Crane Co. ---- 29
Crowell & Steele, Inc. ---- 88
Dallas Aircraft Sales ---- 68
Dowell Incporated ---- 16
*Durbin-Durco ---- 88
The Eagle-Picher Co. ---- 77
*Geo. E. Failing Supply Co. ---- 75
Ft. Worth Laboratories ---- 88
General Electric Co. ---- 13
*Goodall Rubber Company of Texas ---- 63
The Goodyear Tire & Rubber Co. ---- 3
*Gray Tool Co. ---- 5
Gulf Engineering Co. ---- 88
*Helicoid Gage Division American Chain & Cable Co. ---- 56
Houston Laboratories ---- 88
*Hughes Tool Co. ---- I Cover
*International Derrick & Equipment Co. ---- 71
*International Harvester Co. ---- 4
The International Nickel Co. ---- 8
*The Jeffrey Manufacturing Co. ---- 47
W. P. Jenny ---- 88
*Jensen Brothers Manufacturing Co. ---- 73
*The S. M. Jones Co. ---- 40
Jones & Laughlin Steel Corp. ---- 18
Jones & Laughlin Supply Co. ---- 55
*Lane-Wells Company ---- 86
*Larkin Packer Co. ---- 20
*Lebanon Steel Foundry ---- 30
*Line Scale Co. ---- 64
Lone Star Cement Co. ---- II Cover
*Magnet Cove Barium Corp. ---- 7
*McCullough Tool Co. ---- 51
*Mission Manufacturing Co. ---- 61
Mudrite Chemicals ---- 88
*The National Supply Co. ---- 14-15
National Tube Co. ---- 43
*Oil Well Supply Co. ---- 49
*Owen Tool Co. ---- 87
*Patterson-Ballagh Division Byron Jackson Co. ---- 52 and 87
Pelican Well Tool & Supply Co. ---- 74
*Penberthy Injector Co. ---- 62
Pioneer Air Lines ---- 85
*Reed Roller Bit Co. ---- 79
The Richards Co. ---- 83
*Rollway Bearing Co. ---- 10
Sheffield Steel Corp. ---- 2
*Standco Brake Lining Co. ---- 88
*Sterling Machinery Corp. ---- 65
*Templeton, Kenly & Co. ---- 65
Trading Post Section ---- 80
United States Steel Corp. ---- 43 and 49
U. S. Treasury ---- 12
*Wilson Manufacturing Co. ---- III Cover
Wilson-Snyder Manufacturing Division Oil Well Supply Co. ---- 49
The Youngstown Sheet & Tube Co. ---- 22

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